OROMIA EDUCATIONAL BUREAU

BIOLOGY READING MATERIAL AND WORK SHEET FOR GRADE TEN

UNIT THREE, FOUR AND FIVE

PREPARED

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FINFINE

UNIT THREE

Endocrine glands

- Glands in our body can be grouped in to:-
  A. Endocrine: - ductless; less in number
  B. Exocrine: - have duct; many in number
- Exocrine glands release their secretion in to the duct or tube which carry to target organ
- Ex. -Sweat
  -mammary } glands
  - Salivary
- Endocrine glands release their secretions (hormone) directly in to the blood
- Endocrine system is the system of glands which produce chemicals called hormone to co-ordinate our body
- Most hormones only affect certain tissues or organs
- They can act very rapidly, but often their effects are slower and longer lasting than the results of nervous control.

1. Pituitary Gland

- Where it found:- in the brain
- Its size :- a pea sized
- The alternative name:- master (controller) of glands
- Main role:- secrete d/t hormones that controls the secretion of other hormones
- Other role:- co-ordination between the nervous and hormonal systems of control

2. **Thyroid Gland**

- It is found in the neck
- It uses iodine from diet to produce thyroxin.
- Thyroxin:- controls the metabolic rate of your body
  -how quickly substances are built up and broken down
  -how much oxygen your tissues use and how the brain of a growing child develops
- If overactive thyroid, it makes too much thyroxin
  - Metabolism starts to go very fast
  - losing a lot of weight
  -Sweating a lot } symptoms
  -becoming irritable
- If the thyroid doesn't make enough thyroxin:-
  -feel tired
  -lack energy
- Low levels of thyroxin can cause problems in:-
  -getting pregnant
  -miscarriages
  -still births
- If small children do not make enough thyroxin:-
  -their growth is stunted
  - do not develop normally } this is called cretinism
  -have difficulties in learning
- The most common reason for not making enough thyroxin is a lack of iodine in the diet
- Without iodine, the thyroid gland works very hard to make more thyroxin
- Thyroid will grow and enlarge to make right amount of thyroxin
- This is celled **Goiter**
- Women and children are more affected than men

Q. why do women and children more affected by iodine deficiency?

3. **Insulin**

- It controls the blood sugar level
- So, it prevents diabetes
- Our cells need constant supply of glucose for respiration
- Glucose is transported around the body to all the cells by blood
- level of sugar in our blood is controlled by hormones produced in our pancreas
- Without this control mechanism, blood glucose level varies
- i.e. it increase after meal and decrease with no meal

4. **Pancreas**

- It is a small pink organ found below our stomach.
- It is used to prevent the internal disturbance
- It constantly monitors blood glucose concentration by releasing:-
  - A. Insulin
  - B. Glucagon
- Insulin and Glucagon act antagonistically
- When blood glucose level is raised above an ideal after meal, insulin is released and stimulates liver to convert remove any glucose not needed.
- The soluble glucose is converted to an insoluble carbohydrate called glycogen and stored in your liver.
- And when blood glucose concentration falls below the ideal range, glucagon is released w/c stimulate liver to break down glycogen, converting it back into glucose
- This control mechanism of pancreas is used to maintain blood glucose concentration fairly constant at about 90 mg glucose per 100 ml of blood

Q. Compare and contrast endocrine and exocrine glands
Q. What are the two hormones that involved in the control of our blood sugar levels?
Q. What is the effect of shortage of iodine in our diet?
Q. Why do you think pituitary gland is said controller?

The causes and treatment of diabetes

- Sometimes, pancreas does not make enough – or any insulin
- Without insulin, blood sugar levels get higher and higher after you eat food
- As a excess glucose in the blood and kidneys produce glucose in your urine
- This condition is called Diabetes
- Its symptoms include:-
  1. Lot of urine produced w/c cause thirsty all the time
  2. Because glucose can't get in to the cell, lack of energy and filling tired
  3. Fats and protein used instead, w/c cause los of weight
- There are two type of diabetes
  - Type I
  - Type II

TYPE I diabetes

- appears in children and young people
- It is inherited
- cannot avoided

TYPE II Diabetes

- appears later in life
- it can be linked to being obese or possibly very underweight

5. **Adrenaline**

- It is produced by adrenal glands
- adrenal gland is found on the top of kidneys
- Adrenaline is the hormone of fight or flight
- During:- stress
  - Angry
  - frighten
  - excite

  } adrenal gland secretes a lot of adrenaline which rapidly carried in to blood stream
- Adrenaline prepares your body for action
- so that, you can run fast to escape or fight successfully

6. **The gonads**

- Are the endocrine glands which produce some of the sex hormones.
- These are the testes and the ovaries
- They become active at the time of puberty

The role of the testes

- Puberty in boys usually begins between the ages 9-15
- The time is not common to all individuals
- No two people experience puberty in exactly the same way
- The chemical changes which trigger puberty are unseen
- The pituitary gland starts to produce increasing amounts of FSH
- This in turn stimulates the male gonads (testes) to begin developing and producing the male sex hormone testosterone

Q. What is fight or flight? Which hormone controls this situation?

Q. what are the main changes at puberty in both sexes?

The menstrual cycle

What is menstruation?

Is it natural process?

OR

The symptom of any diseases?

- The menstrual cycle is a sequence of events which takes place approximately every four weeks throughout the fertile life of a woman, from the age of puberty to around 50 years of age
- At the puberty stage, pituitary secretes two different hormones called:-
  A. FSH (follicle stimulating hormone)
  B. LH (luteinizing hormone)
- FSH-stimulates the growth and maturation of graafian follicles in females
- FSH also affects the ovary itself which starts making the female hormone oestrogen
- This in turn stimulates the uterus to build up:-
  - a thick
  --spongy

  } lining with lots of blood vessels ready to support a pregnancy
- About 14 days after the ova start ripening, one of them bursts out of its follicle
- This is called ovulation
- when it happens the hormone levels from the pituitary begin to drop dramatically
- After ovulation the remains of the follicle forms the corpus luteum(a yellow body)
- corpus luteum:- the cell mass that remains after the release of an egg.
- It secretes both progesterone and oestrogen
- Progesterone makes sure that for some days the uterus lining stays thick and spongy and stimulates the growth of more blood vessels, ready to receive a fertilized ovum.
- If a pregnancy occurs the embryo will immediately get a rich supply of food and oxygen.

- About ten days after ovulation (when no pregnancy has occurred) the ovary reduces the levels of both oestrogen and progesterone
- As the chemical messages change again the blood vessels which are supplying the thick spongy lining of the uterus close down
- The lining detaches from the wall of the uterus and is lost through the vagina as the monthly period or bleeding
- However, if the ovum has been fertilized it will reach the uterus and sink into the thick, spongy lining, attach itself (implant) and start to develop

Reproductive health

- Pregnancy to be formed:-
  - Sperm should be successfully joined with ovum
- The sperm gets inside the body of the woman during sexual intercourse
- Sperm can live for up to three days inside a woman's body
- But once an ovum is released from the ovary, it is fertile for only a few hours – 24 at most
- The erectile tissue in the penis fills with blood so that it becomes erect and can be placed inside the vagina
- The sperm move from the testes through the urethra, and semen containing millions of sperm is released inside the vagina
- This process known as ejaculation
- The sperm move through the cervix into the uterus then to the Fallopian tube
- It is in the fallopian tube where sperm and ripe ovum mix each other(fertilization)
- Out of the millions of sperm released, only a few hundred to a few thousand actually reach the ovum –and only one of those will actually fertilize it
- sperm manage to reach the Fallopian tubes only around half an hour after they are released
- The ovum which bursts from the follicle at the moment of ovulation has no way of moving itself
- It is then moved along the tube by the beating of the cilia, which carry the ovum towards the uterus.
- Fertilization(joining of single sperm with ovum) in human it is also called **conception**

Contraception

- It the method of controlling fertility
- Contraceptive method can be:-
  A. Traditional
  B. Modern

Traditional	Modern
-vinegar-soaked sponges	- condoms
-mixtures of camel dung	- Different hormones
-herbs placed in the vagina	

- Many of these traditional methods were harmful and did not work, they were not scientific at all
- Contraception means 'against pregnancy'
- it describes ways in which pregnancy can be avoided
- The effectiveness of contraceptive methods is measured per '100 woman years
- There are two types of contraceptive methods
  A. Natural
  B. Artificial

Q. What is the difference between natural and artificial methods of contraception?
Q. What are advantages and disadvantages of natural methods of contraception?

Physical or barrier methods of contraception

- Involve physical barriers which prevent the meeting of the ovum and the spermatozoa.

1. Male and Female Condoms

- A thin latex sheath is placed over the penis and vagina during intercourse to collect sperm
- Gives better protection against pregnancy when combined with spermicide

Q. What are advantages and disadvantages of male and female condoms?

2. The diaphragm or cap

- A thin rubber diaphragm is inserted into the vagina before intercourse to cover the cervix and prevent the entry of sperm

Q. What are advantages and disadvantages of diaphragm?
Q. Compare and contrast condom and diaphragm?
Q. Which hormones of menstrual cycle released by pituitary?

Hormonal methods of contraception

- Use natural hormone to prevent conception

1. The mixed pill

- One of the most reliable methods of contraception.
- The pill contains the female hormone oestrogen
- This raises the level of oestrogen in the blood
- This is detected by pituitary gland
- This in turn slows the production of FSH
- Without rising FSH levels no follicles develop in the ovary and no eggs mature to be released
- Without mature ova there can be no pregnancy
- The pill also contains progesterone

Hormonal method can be used in different forms like:-

A. hormonal injection
B. hormonal implant

The basic principle of these methods is the same, using natural hormones in different forms.
Q. What is hormonal injection and implantation?
Q. What are advantages and disadvantages of each hormonal injection and hormonal implantation?
Q. What is the effectiveness of each hormonal injection and hormonal implantation?

Sterilization or surgical method of contraception

- is the ultimate form of contraception
- By cutting or tying the tubes along which eggs or sperm travel

Sterilization (surgical) may be:-

Vasectomy:- the sperm ducts (vas deferens) are cut, preventing sperm from getting into the semen.
Tubectomy:- the Fallopian tubes are cut or tied to prevent the ovum reaching the uterus or the sperm reaching the ovum.

The IUD or intrauterine device

- It does not prevent conception – the ovum and the sperm may meet – but it interferes with and prevents the implantation of the early embryo.
- An IUD is a device made of plastic and a metal, frequently copper, which is inserted into the uterus by a doctor and remains there all the time

Q. What are advantages of IUD?
Q. What are disadvantages of IUD?
Q. What is the effectiveness of IUD?

Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome (HIV/AIDS)

- AIDS is the medical term for a combination of illnesses that result when the immune system is weakened or destroyed.
- HIV is a virus that attacks the immune system, making the sufferer susceptible to other diseases.
- HIV attacks immune system so you cannot fight off infections such as TB or even a cold
- It can be spread in four body fluids:-
  -Blood - breast milk.
  -Semen - vaginal secretions

- The virus can only spread if bodily fluids from infected person enter the bloodstream of an uninfected person.
- It is most commonly spread through unprotected sex with an infected partner
- An HIV-infected mother can infect her baby during:-
  -Pregnancy
  - Birth
  -Breastfeeding.
- HIV can also be passed on by an infected blood transfusion
- By sharing non-sterilized sharpen materials

Q. What are symptoms of HIV infection?

- HIV targets T-lymphocyte which is the part of our immune system that fights against infection
- As HIV progress to AIDS, it lowers the number of free T-helper cells which results in more infection
- Finally the T-helper cells severely reduced, which means the body of infected individual cannot fight against other opportunistic infections
- There is no vaccine and no cure for HIV/ AIDS
- But there are drugs called antiretroviral that reduce the progress of HIV to AIDS
- They are very effective if they are used in combination called HAART (highly activity anti-retroviral treatment

Homeostasis

- The word homeostasis comes from two Greek words:-
  homoios which means 'like' or 'the same'
  stasis, which means state
- And when we combine the two word:- keeping the conditions in the inside of your body (the internal environment) in the same state all the time
- The nervous } systems play an enormous role in
  hormonal } maintaining this important balance
- Feedback mechanisms involving both the nervous system and hormonal systems play a very important part in maintaining homeostasis.
- Most of these control systems in the body are examples of negative feedback
- This means that when levels of a substance in your body rise, changes are made which lower the levels again.
- Similarly, when levels of a substance fall, changes are made so that it rises again to the original levels.

Controlling temperature

- One of the most important factors which should be controlled
- Temperature is a way of measuring hotness or coldness
- internal or core temperature is maintained at the temperature (around 37 °C)
- Living organisms are continually gaining and losing heat from:-
  -Cellular respiration
  - Conduction

-Convection
- Radiation from their surroundings

- It is the balance of these gains and losses that gives the core temperature
- Not all animals need to control their core body temperatures.
  EX. Protista and small animals living in big bodies of water like the sea have no means of temperature regulation because they do not need them
- Q. What is the difference between HIV and AIDS?
- Q. What are stages of HIV infection and what is window period?
- Q. What is the main way in which HIV is transferred from infected person to healthy person?
- Q. Why do you thing animals need to control their core temperature?

- Larger animals must be able to regulate their body temperatures so they can avoid cell damage from overheating
- But they also gain enough heat to have an active way of life.
- There are two types of animals:-
  Poikilotherms
  Homoiotherms

Poikilotherms:-

- Animals whose internal temperature varies along with that of the environmental temperature
- Their body temperature is governed by the external temperature
- They rely largely on the environment for their body heat
- Their body temperature can vary over a wide range
  EX. Fish and Reptiles

Homoiotherms:-

- organisms with a relatively constant internal body temperature
- Their temperature is independent of the environmental temperature
- Their body temperature is usually higher than the external temperature
  EX. Birds and Mammals
- Humans are a well-known example of homoiotherms

Temperature control in poikilotherms

- Poikilothermic animals have to rely on changes to their:-
  -Behavior
  -Body structures
  } To use the heat in their environment to maintain steady & useful body temperature

A. When they are cold they may:
-bask in the sun
- press their bodies close to a warm surface
- erect special sails or areas of skin which allow them to absorb more heat from the sun

B. When they are getting too hot they may:
-move into the shade
-move into water or mud

Temperature control in homoiotherms

- There are two main methods
  1. Physiological
  2. Behavioral
  } methods of T° regulation

1. Physiological methods of temperature regulation

- Sweating:- when you are hot sweat oozes out of the sweat glands and spreads over the surface of the skin. As the water evaporates it cools the skin, taking heat from the body
- Vasodilation:- If body temperature raises, the blood vessels supplying the capillaries in the skin dilate

So that, more blood flows through the capillaries. As a result, skin flushes and more heat is lost through radiation from the surface

- Panting and licking:-Some animals such as:-
  - Dogs } only have sweat glands in small areas of
  -Cats. } the skin such as the feet

  These animals may lick themselves, coating parts of their bodies with Body temperature (°C) saliva which evaporates and cools them down. They also pant, which allows water to evaporate from the moist surfaces of the mouth and this also cools them down
- Vasoconstriction:- When core temperature begins to fall, the blood vessels which supply skin capillaries constrict. This to reduce the flow of blood through the capillaries. This again reduces the heat lost through the surface of the skin, and makes people look paler
- Piloerection (pulling the hairs upright):- human beings, like other mammals, have a layer of hair over their bodies. The hair erector muscles contract. This pulls the hairs upright, trapping an insulating layer of air which is very effective at conserving heat.
- Shivering and metabolic responses:- If the core body temperature drops, metabolic rate speeds up. This produce more heat energy, so body temperature starts to go up. As result, boy may start to shiver When you shiver your muscles contract rapidly, this involves lots of cellular respiration. This releases some energy as heat which is used to raise the body temperature
- Fat layer under the skin (subcutaneous fat):- Homoiotherms only lose or gain heat when they really need to. Under the surface of the skin is an insulating layer of fat. This prevents unwanted heat loss It very common in animals which live in very cold conditions

  EX. - seals } The very thick layer of fat under
  - whales } their skin is known as blubber

3, Behavioral methods of temperature control

Homoiotherms do not only rely on physiological methods to control their internal body temperature Like poikilotherms, they use behavioral method

Clothing:-Choosing suitable clothes depending on the weather condition. Human being do not have much fur or feather

Seeking shade or shelter:- people look for shade to keep them cool when it is hot and sunny condition

Taking high-calorie food in cold conditions:-People need to use more metabolic energy to keep warm. They eat high-calorie food in cold conditions.

Hibernation:-In countries which have very cold winters, some homoeothermic animals will hibernate. They go in to deep sleeping

These animals eat a lot and gain a lot of fat before hiding away in a warm nest or burrow and going into a very deep sleep. Their metabolic rate falls and so does their body temperature. They do not wake up until the warmer weather of spring arrives with more food for them to eat

EX. Dormice and Hedgehogs in the UK.

Aestivation:-In hot countries, some animals 'hibernate' through the hottest weather as they cannot keep their bodies cool enough. These animals usually hide themselves underground or under a layer of mud and go into a deep sleep until conditions cool down again

For example:-East African land snails

Wallowing or bathing:- some animals cannot lose enough heat through sweating alone to keep their bodies cool enough in hot weather. This is a particular problem for some larger animals. By wallowing in mud or bathing in water, the animals cover themselves in water. The water evaporates from the surface of their skin, cooling them down

EX. Elephants and Pigs

Homeostasis and the kidney

Excretion:- Getting rid of the waste products which could build up in our body and damage our cells. There are two main metabolic waste products which would cause major problems in our body if the levels rise These are:- carbon dioxide and urea. The organs which are involved in getting rid of these metabolic wastes are known as excretory organs.

The main excretory organs in our body are:-

-lungs
-kidneys
- skin

The Co2 produced during cellular respiration is almost all removed from the body via the lungs when we breathe out. The lungs are not only the site of gas exchange for respiration, they are also an excretory Increased level of Co2 due to exercise is picked up by sensory receptors in our arteries and brain, which send electrical impulses to stimulate the breathing centers in our brain. Brian send impulses to make we breathe faster and deeper. As a result, the carbon dioxide levels fall.

Low level of Co2 is also detected by the same receptors and so the stimulation of the breathing centers is reduced which in turns reduce breathing rate. This is an example of a feedback mechanism - as the Co2 levels go up, the breathing rate goes up which makes the Co2 levels fall, so the breathing rate returns to normal. Another metabolic waste which can cause serious problems is urea.

Urea is produced in our liver when excess amino acids are broken down. These excess amino acids come from protein in the food we have eaten and from the breakdown of worn-out body tissue.

Our body cannot store excess protein or amino acids, so any excess is always broken down. The amino acids are converted into carbohydrate (which can be stored or used) and ammonia. The ammonia is then combined with Co2 to make urea. The urea which is produced is a form of nitrogenous waste and it leaves our liver via the blood. The urea is then filtered out of the blood by the kidneys and removed in the urine Kidney are the main excretory organ as well as organ of homeostasis(regulating water and salt balance) Regulation of water and salt concentration by kidney is called osmoregulation.

The kidneys

- control the levels of water and ions in your body
- Blood flows into the kidney along the renal artery.
- The blood is filtered, so fluid containing:-
  -Water
  - salt
  - Urea
  -glucose

  } and many other substances is forced out into the kidney tubules.
- Then everything the body needs is taken back (reabsorbed) including all of the sugar and the mineral ions needed by the body
- The waste product urea and excess ions and water not needed by the body are released as urine
- Each kidney has a very rich blood supply and is made up of millions of tiny microscopic tubules (nephrons) which are where all the filtering and reabsorption takes place

Bowman's capsule:-

- The site of the ultrafiltration of the blood
- Several layers of cells – the wall of the blood capillaries and the wall of the capsule – act as a filter
- water, salt, glucose, urea and many other substances are forced out into the start of the tubule –
- This process is known as ultrafiltration – filtration on a very small scale

Q. Why do blood cells and larger proteins do not passed through the blood vessels?
Q. How do you compare the concentration of substances in the liquid in the capsule and that in the blood?
Q. What are the functional units of the kidney?

Glomerulus:-

- The knot of blood vessels in the Bowman's capsule where the pressure builds up so that ultrafiltration occurs.

First coiled (convoluted) tubule: -

- The liquid which enters this first tubule is known as the glomerular filtrate.
- The first tubule is where much of the reabsorption takes place
- All of the glucose is actively taken back into the blood along with around
- It has many microvilli to increase the surface area for absorption

Loop of Henle:-

- where the urine is concentrated and more water is conserved.

Second coiled (convoluted) tubule:-

- where the main water balancing is done. If the body is short of water, more is reabsorbed into the blood in this tubule under the influence of the anti-diuretic hormone or ADH
- Diuresis means passing urine, so anti-diuresis means preventing or reducing urine flow
- Also ammonium ions and some drugs are secreted from the blood into this tubule to get rid of them.

Collecting duct:-

- where the liquid (essentially urine) is collected.
- It contains about 1% of the original water, with no glucose at all
- Urine is formed constantly in our kidneys, and it drips down to collect in our bladder.
- We can control the opening of the bladder by a strong ring of muscle known as a sphincter at the entrance to our urethra, the tube that leads from the bladder to the outside world
- The amount of water lost from the kidney in the urine is controlled by a sensitive feedback mechanism involving the hormone ADH

Antidiuretic (ADH) hormone

- A hormone produced by the pituitary gland that reduces the production of urine in the kidneys and thereby prevents water loss
- The changes in urine concentration is detected by a special area called osmoreceptors in the brain

The liver and homeostasis

-Kidney
- Skin

} Are not the only the organ of homeostasis but our Liver also play a role in maintaining internal environment at constant condition

- It is the largest individual organ in your body
- The liver cells are very active – they carry out a wide range of functions, many of which help to maintain a constant internal environment
- The liver has a very special blood supply.
- In addition to the hepatic artery and vein, there is another blood vessel which comes to the liver directly from the gut.
- This is the hepatic portal vein and it brings the products of digestion to the liver to be dealt with

Q. What are the major roles of liver in homeostasis?

THANKYOU

END OF UNIT THREE

REVIEW QUESTIONS ON UNIT TREE

Dear students! After you read the short notes prepared, do on the following questions accordingly

1. Which of the following endocrine glands secretes a hormone that directly affects the metabolic rate of the body? A pituitary gland B ovary C thyroid D pancreas
2. Which of the following reproductive hormones is produced by the pituitary gland?
   A. Oestrogen B. testosterone C. follicle stimulating hormone D. progesterone
3. Which of the following changes takes place at puberty ONLY in boys?
   A. growth spurt B. voice deepening C. body shape changes D. mature gametes produced
4. Which of the following is not an example of homeostasis?
   A. Control of the blood sugar level C. control of the body temperature
   B. Control of the water content of the blood D control of the length of the limbs
5. Which of the following areas is NOT part of the nephron (kidney tubule)?
   A. Bowman's capsule B. urinary bladder C. loop of Henlé D. first coiled tubule
6. The site where the urine is concentrated and more is conserved is ?
   A. Loop of henle B. second coiled tubule C. Bowman's capsule D. Glomerulus
7. In which part of the female reproductive system does fertilization and implantation respectively takes place? A uterus and cervix B. fallopian tube and uterus
   C. cervix and vagina D. fallopian tube and uterus
8. Which of the following is NOT a way to help prevent the spread of HIV/AIDS?
   A. Washing your hands after using the toilet. C. using a condom when you have sex.
   B. Having only one sexual partner. D. not sharing needles for intravenous drug use.
9. In which of the following way HIV not pass from infected person to healthy person?
   A. Sharing sharpen materials C. donating infected blood
   B. Having dinner with infected person D. making unprotected sex
10. The endocrine gland that is probably malfunctioning if a person has a high metabolic rate is the
    A. Adrenal gland B. thyroid gland C. Pancreas D. pituitary gland
11. The secretions from which of these glands differs between males and females?
    A. Adrenal. B. Parathyroid. C. Gonads D. Pancreas
12. The only endocrine glands that lay dormant during childhood to activate at puberty are the:
    A. Pancreas B. Adrenal glands C. Thyroid gland D. ovaries and testes
13. The endocrine gland(s) that sits on top of the kidneys and secretes both metabolic stabilizers and stress regulators: A pancreas B adrenal glands C thyroid gland D pituitary gland
14. The endocrine system works together with the _____ system to maintain the body's equilibrium?
    A. digestive system B. Nervous system C. Respiratory system D. Reproductive system
15. The hormone whose deficiency results in slow growth and mental development in children is
    A. Thyroxin B. Adrenaline C. Parathyroxin D. Insulin
16. In human body, which hormones work antagonistic to each other? A. Insulin and Glucagon
    B. Oestrogen and Progesterone C. Testosterone and Thyroxin D. Adrenalin and Glucagon
17. When does the ripening egg burst out of the follicle in the menstrual cycle?
    A. After 14 days from the monthly period has started
    B. After 28 days from the monthly period has started
    C. After 20 days from the monthly period started
    D. After 10 days from the monthly period has started
18. The adrenal glands are attached superiorly to which organ?
    A. thyroid B. liver C. kidneys D. hypothalamus
19. In the elderly, decreased thyroid function causes_____.
    A. Increased tolerance for cold C. decreased basal metabolic rate
    B. decreased body fat D. osteoporosis
20. The influence of oxytocin on the uterus during child birth and the subsequence effect of uterine stretch on the release of oxytocin is an example of:-
    A. Negative feedback B. positive feedback C. extrinsic control D. intrinsic control

21. What is the role of liver in regulating the blood sugar level when it rises above the normal?
A. Converting the excess sugar into glucose and store C. excreting the excess sugar in the blood
B. Respiring the excess sugar in the body D. converting glycogen in to glucose

22. Which of the following is **not** part of kidney nephron? A. medulla B. Glomerulus
C. loop of henle D. Bowman's capsule

23. Which of the following temperature regulation mechanism is not grouped with the others?
A. Clothing B. Hibernation C. Aestivation D. Vasodilation

24. Which of the following contraceptive method can be used by a human male?
A. IUD B. Vasectomy C. Human injection D. Diaphragm

Item number 25 is based on the following terms related to temperature regulation.
1 . Aestivation 2. Vasodilation 3. Fat layer 4. Hibernation 5. Sweating
6. Panting.

25. The mechanisms involved in hot weather to control internal temperature are
A. 1, 2, 3, 4 B. 1 , 2 , 5 , 6 C. 2, 4, 5, 6 D. 2, 3 , 5 , 6 .

26. Which of the following hormones is secreted by pituitary gland?
A. Thyroxin B/ Progesterone C/ Parathyroid D/ Luteinizing hormone

27. Which of the following physiological methods of temperature regulation occurs in homoeothermic animals when temperature begins to fall?
A. Vasoconstriction B/ Panting C/ Vasodilation D/ Licking

28. Which of the following is correct about anti _ diuretic hormone (ADH)?
A. it facilitates reabsorption in the first convoluted tubule
B. it is produced when the water content of the blood is too low
C. it works in the direction of producing dilute urine
D. its production is initiated by low salt concentration in the blood.

Item number 29 is based on the following list of parts of the nephron.
1.Glomerulus 2. Bowman's capsule 3. Collecting duct 4. Loop of Henle
5. First coiled 6.Second coiled tubule .

29. Which parts of the nephron are involved in ultrafiltration?
A. 1 and 4 B. 1, 2 and 5 C. 1 and 2 D. 4 , 5 and 6.

30. Evaporation of sweat cooling the body is an example of:-
A. Negative feedback B. positive feedback C. extrinsic control D. intrinsic control

Item number 31 is based on the following list of contraceptive methods.
1. Condom 2. Mixed pill 3. Diaphragm 4. Intrauterine device

31. Which of the methods are physical barriers of contraception? A. 1 and 2 B. 3 and 4 C. 1 and 3 D. 1, 2, 3 and 4.

32. The traditional belief behind female mutilation is that, it:-
A. avoids infection throughout their life D. increases the fertility of individuals
B. keeps girls clean and gets acceptance by men for marriage
C. Allows easy delivery of child during birth.

33. Which of the following serves as an excretory organ in your body?
A. Pancreas B. Liver C. Heart D. Lung.

34. Which of the following is true about the function of the gonads?
A/ they produce hormones of fight or flight
B/ they produce hormones that control the development of secondary sexual characteristics
C/ they produce hormones that control the use of oxygen by the body tissues
D/ they produce hormones that control the metabolic activity of the body.

35. Female genital mutilation (FGM) is one of the traditional activities widely practiced in our country. Which of the following is the consequence of FGM?
A. It makes sex more pleasurable C. it makes women more fertile

B. It makes women cleaner D/ it brings many problems at giving birth.

36. Contraception method that involves burying small silicon capsules containing female hormones under the skin is
    A. Hormone implants B. Intrauterine device C. Hormone injection D. mixed pills.
37. Diabetes mellitus can be treated by
    A. avoiding sex with infected person C. keeping personal hygiene
    B. Injecting insulin before meal D. avoiding contact with infected person.
38. What is the significance of homeostasis? It is important to
    A. denature the enzymes and stop cell activities in our body
    B. increase the cellular activities of our body systems
    C. maintain the internal conditions of the body in stable state
    D. Burn food molecules to produce carbon dioxide.
39. When poikilotherms get too hot they
    A. Bask in the sun C. press their body in worm surface
    B. Erect special sails of their skin D. move into shade.
40. Which of the following organisms is a poikilothermic animal?
    A. Elephant B. Fish C. Human D. Ape
41. Most of the glucose that is filtered through the glomerulus undergoes reabsorption in the :
    A. proximal tubule C. second coiled tubule
    B. First coiled tubule D. loop of henle
42. The procedure of maintaining the amounts of salt and water in the body fluids is called:-
    A. Homeostasis B. Excretion C. Osmoregulation D. Thermoregulation
43. In the nephron of human kidney, the network of capillaries is known as:-
    A. First coiled tubule B. second coiled tubule C. Bowman's capsule D. Glomerulus
44. A ring of muscle that contact to control the amount of urine released is:-
    A. Urethra B. sphincter C. collecting duct D. ureter
45. The hypothalamus will affect the release of ADH in response to all the following stimuli except :
    A. dehydration B. decreased blood osmolality C. pain , anxiety , or surgical stress D. nicotine

UNIT 4

Food making and growth in plants

The leaf

- The flowering plant is a complete organism with organs carrying out particular functions. There are four main organs of a flowering plant

  A. Flowers:- which contain the reproductive organs.

  B. The leaves:-use light energy, Co2 and H2o to make food by photosynthesis.

  C. The stem:- provides support and a transport system for water and minerals to the leaves and flowers. It also transports food from the leaves to the roots and flowers.

  D. The roots which anchor the plant to the ground and absorb water and minerals

A photosynthesizing machine

- Plants take the inorganic molecules Co2 and H2o and use them to produce the organic molecule glucose along with inorganic O2 in the presence of light energy
- photosynthesis is the basis of all life on Earth – it provides the food we eat and the oxygen we breathe
- Plant leaves are perfectly adapted to allow the maximum possible amount of photosynthesis to take place

Adaptations of a leaf for photosynthesis

- The leaf is flat and wide, giving a large surface area to collect light and short distances for gases to diffuse.
- The veins bring water from the soil to the cells
- The waxy cuticle is a waterproof layer found on the surface of many leaves to help prevent water loss
- The palisade mesophyll is the main photosynthetic tissue of the plant. There are many cells, closely packed together near the surface of the leaf to get as much light as possible. Each cell has many chloroplasts – hundreds of them – which are spread out through the cytoplasm of the cell when light levels are high but which cluster at the top of the cell when light levels are low.
- The spongy mesophyll has fewer cells with fewer chloroplasts. However, there are lots of air spaces and a big surface area for gas exchange. Some photosynthesis takes place here but more importantly it is where the Co2 needed for photosynthesis moves into the cells, and the O2 moves out. The water lost in transpiration evaporates from the cells here as well.
- The lower epidermis has openings known as stomata which allow Co2 to diffuse into the leaf and O2 and water vapor to diffuse out.
- The guard cells open and close to control the entry of Co2 into the leaf and also to control the loss of water by transpiration
- waxy cuticle:- waterproof upper surface layer found in many types of leaf
- palisade mesophyll:- the main photosynthetic tissue of a leaf
- spongy mesophyll:- the main gas exchange tissue of a leaf
- lower epidermis:- surface layer of a leaf containing stomata
- Stomata:- pores mostly on the lower surface of leaves that can be opened or closed to control gas exchange and water loss
- Guard cells:- pairs of cells which surround and control the size of stomata by altering their shape
- The vascular bundles contain the xylem, dead tissue and the phloem, living tissue
- Each chloroplast contains stacks of membranes and chlorophyll to give an increased surface area for photosynthesis to take place.
- Xylem:- the hollow cells of a plant that transport water and minerals to plant cells
- Phloem:- the food conducting living tissue of a plant chloroplast the organelle in the cytoplasm of plant cells where chlorophyll is stored, and photosynthesis takes place

Photosynthesis

- plants need food to provide them with the energy for respiration, growth and reproduction
- Other organisms(animals) feed on others, i.e. cannot make their own food, heterotrophs
- plants produce their own food in a process known as photosynthesis. They are known as autotrophs (feeding themselves)
- Photosynthesis takes place in the green parts of plants, especially the leaves, in the presence of light

$$\text{carbon dioxide} + \text{water} \xrightarrow[\text{light energy}]{\text{chlorophyll}} \text{glucose} + \text{oxygen}$$

The chemical equation for the same process is:

$$6CO_2 + 6H_2O \xrightarrow[\text{light energy}]{\text{chlorophyll}} C_6H_{12}O_6 + 6O_2$$

- During photosynthesis light energy from the sun is absorbed by a green substance called chlorophyll that is found in the chloroplasts of some plant cells.
- The energy that is captured is used to convert Co2 from the air and water from the soil into a simple sugar, glucose, with oxygen as a by-product
- Some of the glucose produced during photosynthesis is used immediately by the cells of the plant for respiration to provide energy
- What is needed for photosynthesis
- For photosynthesis to occur successfully:-
  - -carbon dioxide
  - - Water
  - - Supply of light energy
  - - chlorophyll

  } are needed

The need for light

- It is known that plants need light during photosynthesis. But this is not to mean that, all photosynthetic reactions depend on the presence of light
- Regarding this, reactions can be:-
  - A. Light dependent
  - B. Light independent

  } reaction
- The light-dependent reactions cannot take place without light energy.
- The light energy is absorbed by chlorophyll molecules through activation of their electrons and used to split water molecules into hydrogen and oxygen.
- ATP for energy is produced as well.
- The O2 is given off as a gas.

Transport

- osmosis plays a very important role in plants
- The transport systems rely heavily on osmosis, diffusion and active transport

- Trees are supported by their woody trunks. But many plants do not have woody tissue, and so they have no structural support. They rely on having cells which are rigid and firm. These firm cells are maintained by the movement of water into the cells by osmosis to create turgor.
- This is one reason why osmosis is so important for plants. osmosis very important for moving water around within the plant itself
- Water moves into the plant root cells across the cell membrane along a concentration gradient.
- The roots are covered with special cells, which have tiny hair-like extensions called the root hairs.
- These root hairs increase the surface area for osmosis to take place.
- Once water has moved into the root hair cells, the cytoplasm of the root hair cells is more dilute than the cytoplasm of the surrounding cells.
- Water moves into the neighboring cells by osmosis. These cells now have more dilute cytoplasm than the cells next to them, and the water moves on by osmosis until it reaches the xylem and the transpiration stream.

Active transport in plants

- Mineral ions in the soil are usually found in very dilute solutions – more dilute than the solution within the plant cells. By using active transport plants can absorb these mineral ions, needed for making proteins, and other important chemicals from the soil, even though it is against a concentration gradient
- Active transport like this involves the use of energy produced by respiration in the cells.

Transport of materials around the plant

- Food is prepared in the leaves by photosynthesis and transported to other parts of plants
- Water is absorbed by root and move to all parts
- Therefore, plants need a transport system to move substances around their bodies

A double transport system

1. Phloem
2. Xylem

} Are the transport system in plants

The phloem:-

- It is made up of living tissue and it is involved in the transport of organic food made by photosynthesis – from the leaves to the rest of the plant.
- Phloem cells are thin walled and are regularly replaced when they are worn out

Transpiration:- the process by which water absorbed by plants, through the roots, is evaporated into the atmosphere from the plant surface, from the leaves

Q. What is the use of transpiration in plants?
Q. How water is come from root to up the leaves?
Q. What is the adaptation of roots to absorb water?
Q. What are the products of light reaction of photosynthesis?
Q. Concentration of minerals in the soil is less than that of in the plant roots. But minerals move from soil in to the roots to enable them making protein. How this is occurs?
Q. What is turgor pressure? What value does it have for plants?
Q. What is the relation between osmosis and turgor pressure?
Q. What affects the opening and closing of the stomata?

The transpiration stream

- Water is taken into a plant through the roots and moves by osmosis to the xylem tissue
- There is no active transport in the xylem
- The transport of water through a plant is the result of the transpiration stream
- Plants lose water vapor from the surface of their leaves. This loss is known as transpiration
- Most of the transpiration takes place through the tiny holes in the surface of the leaf known as stomata.

- The stomata are there to allow air containing Co2 into the leaf for photosynthesis.
- They can be opened and closed by the guard cells which surround them
- Losing water through the stomata is a side effect of opening them to let Co2 in, but it is vital for transpiration.
- Most of the stomata are found on the underside of the leaf
- unlike the other cells in the epidermis layer , Guard cells contain chloroplasts so they can photosynthesize
- when there is sunlight, the concentration of sugar in the guard cells goes up as a result of photosynthesis
- Water then moves into the guard cells by osmosis from the epidermal cells around them
- The sausage-shaped guard cells become very turgid, and as they swell up they bend, opening a gap – the stoma – between them
- The pore closes when water moves out of the guard cells by osmosis into the surrounding cells and as the level of turgor in the guard cells falls, the stoma closes.

Moving water through the plant

- As water evaporates from the surface of the leaves, water is pulled up through the xylem to take its place
- There is pressure pushing the water up from the bottom – the root pressure – as water moves in by osmosis
- In the xylem, two physical forces help the water to move upwards.
- These are:- A. Adhesive forces
  B. Cohesive

A. Adhesive force:- Forces of attraction between different types of molecule (Ex. Water & wall of xylem)
-It support the whole column of water

B. Cohesive force:- Forces of attraction between similar types of molecule(Ex. Between water molecules)
-The water molecules tend to stick together and get pulled upwards like a string of beads

- When water reaches the xylem in the leaves, the concentration of water in the solution of xylem become higher than the solution in the mesophyll cells in the leaf
- Water moves out from the xylem into the mesophyll cells and so across the leaf by osmosis
- When it reaches a mesophyll cell which is surrounded by air, water evaporates from the surface into the air and diffuses out through the stomata along a concentration gradient.

Q. What are factors affecting the rate of transpiration?
Q. How do you think water loss through the plants is reduced?

Adaptations of plants to reduce water loss in difficult environments

Different environmental factors have different effect on the opening and closing of stomata, so on photosynthesis
Plants which live in very hot areas, where there is relatively little water have adaptations:-

A. They may have very thick, waxy cuticles to reduce any water loss through the overall leaf surface
B. Others have very hairy leaves, which trap a micro-atmosphere around the stomata and reduce water loss
C. Other plants have reduced their leaves to very narrow spikes to reduce the surface area over which water may be lost
D. On some plants the stomata are sunk into pits

Response in plants

All living organisms need to be able to respond to their surroundings through coordination
This may be to find food, move towards the light or avoid danger
Plants achieve their co-ordination and responsiveness through a system of hormones
Hormones are chemical messengers which are produced in one part of an organism and have an effect elsewhere
Plant hormones (phytohormones) have several effects on plants:-
For example, they co-ordinate

Flowering
Cell division
Cell elongation

These are essentially growth processes and plant responses of this type are called growth responses
Since growth is a slow process, most plant responses are slow

The germination of seeds

In most flowering plants, growth starts when the seed begins to germinate

Seeds may have different sizes and shapes, but the basic structure of seeds always contains certain things:-

Food storage tissue is called endosperm. An embryo plant made up of three main parts –

a. the plumule (embryonic shoot)
b. the radicle (embryonic root)
c. the cotyledons (embryonic leaves)

The **testa** (the seed coat) which may be thin and papery like the covering on a groundnut or very strong and hard like the shell of a nut

The number of these embryonic leaves that are present used to group a division of the angiosperms into: -

A. Monocotyledons (one seed leaf)
B. Dicotyledons (two seed leaves)

Endosperm- the nutritive tissue of a seed, consisting of carbohydrates, proteins and lipids

Plumule- the bud, or growing point, of the embryo, above the cotyledons

Radicle -the first part of a seedling (a growing plant embryo) to emerge from the seed during the process of germination

Cotyledons- the first leaves sent out by the germinating seed – the seed leaves

Testa- the hard external coating of a seed

Hypocotyl- the first leaf-like structure that appears on a germinating seed. Grows upward in response to light

Epigeal germination- cotyledons are carried above the ground

Hypogeal germination- cotyledons remain below the ground

Once a seed is mature and conditions are right – it needs

water
Warmth } the seed begins to germinate
Oxygen

As the seed absorbs water, the large insoluble food molecules stored in it undergo chemical changes

They are broken down (hydrolyzed) into soluble food

The main food storage material in seeds is starch, and it is stored either in the cotyledons or in the endosperm. This starch store is converted to sugars by the action of the enzyme diastase

In some seeds fats and oils are stored. In these seeds the enzyme lipase catalyzes the hydrolysis of fats to fatty acids and glycerol

Proteolytic enzymes present in the seeds catalyze the hydrolysis of proteins to amino acids.

A lot of energy is needed during germination.

The seed cannot make its own food by photosynthesis while it is underground, so the energy needed comes from the stored food materials

As a seed germinates its weight decreases as the stored food is used up.

The decrease in weight continues until the seedling is capable of photosynthesizing

Q. What are the major events takes place during germination

Q. What is the difference between monocotyledons and dicotyledons?

Q. What are adhesive and cohesive forces?

Plant hormones and growth

Growth in plants is controlled by chemical messengers called plant hormones

Examples of plant hormones are :-

Auxins (indole-acetic acid, IAA),
Gibberellic acid,
Cytokinin,
Ethylene
Abscisic acid

Some of these hormones promote growth, others inhibit it

Some of them will promote growth in one type of plant tissue and inhibit it in others

Auxin (IAA):- is the best-known plant hormone. It is involved in general plant growth.

It stimulates the elongation of the new plant cells, so they get longer and bigger.

It is also involved in apical dominance. IAA is made at the tip of the main shoot and as it moves down the stem it slows down the growth of side shoots. So the main shoot dominates the whole plant

Apical dominance:- growth concentrated in the terminal bud, allowing it to grow taller, thereby increasing its exposure to sunlight. Auxin also stimulates the growth of roots. If auxin is applied to a cut stem it will stimulate new roots to grow

The best-known function of auxins is in the responses of plants to the world around them. The responses of plants towards things such as light and gravity are called tropisms

Gibberellins:- These hormones stimulate the growth of plant stems. If you take a dwarf plant and give it Gibberellins, the stems will grow until the plant is a normal size.

Gibberellins also help seeds to break their dormant period and start to grow. They do this by stimulating the production of the enzymes needed to break down the food stores in the seeds.

Cytokinins:- are hormones that stimulate cell division in plants so they are very important in plant growth

Ethylene:- a gaseous plant hormone that stimulates fruit ripening and the dropping of leaves

Abscisic acid (ABA):- It inhibits growth and plays a major role in leaf fall. It is also involved in seed dormancy

It may be involved in geotropisms, but it plays a small part compared to IAA.

Tropic responses

This is a response of plants to different stimulus coming from one direction. There are different types of tropic responses

Ex. Plants need light to photosynthesize. They (shoot) grow towards the light to absorb the maximum light

This called positive photo-tropism phototropism is responding to light

When seedlings are placed horizontally, their:-

Roots grow downwards } This is affected by the force
Shoots upwards } of gravity

Movement in response to the stimulus of gravity is called geotropism.

Roots are positively geotropic and shoots are negatively geotropic

Hydrotropism:- the tendency of plants to move or grow towards water

How are tropic responses brought about?

Maize grains germinate to produce a straight shoot called a coleoptile

The growth region of a shoot is some distance below the tip. This fact suggests that removal of the tip would not affect the growth of the shoot

When the tips of the coleoptiles are removed (they are decapitated), they don't grow

The growth of a shoot is promoted by auxins, failure of decapitated seedlings to grow suggests that the auxins are probably produced in the tip

The growth hormone, auxin, produced in the tip is indole-3-acetic acid (IAA). IAA diffuses from the tip to the growth region to initiate growth

THANK YOU

END OF UNIT FOUR

REVIEW QUESTIONS ON UNIT FOUR

Dear students! After you read the short notes prepared, do on the following questions accordingly

1. Which of the following layers of a leaf has largest number of chloroplasts?

A. Upper epidermis B. Lower epidermis C. Palisade mesophyll D. spongy mesophyll.

2. Which of the following is responsible for the absorption of water from the soil?
   A. Phloem B. Cortex C. Xylem D. Root hair.
3. Which of the following plant hormones is correctly paired with its function?
   A. Gibberellic acid_ inhibits growth C. Cytokinin_ stimulates cell division
   B. Ethylene_ inhibit fruit ripening D. Abscisic acid _ stimulates growth.
4. How does the carbon dioxide used during photosynthesis get into the plants? By
   A. Endocytosis B. active transport C. osmosis D. diffusion.
5. The rate of transpiration is inversely proportional to:-
   A. Humidity B. air movement C. Temperature D. light intensity.
6. What do phloem vessels carry?
   A. Water and mineral ions B. dissolved sugars C. mineral ions and sugars D. water
7. Which of the following is an example of hydrotropism?
   A. Tendrils growing around stem C. Roots growing towards a source of water
   B. Pollen tubes growing towards ovaries D. Shoots growing towards light source.
8. Which of the following is true of the light dependent reaction of photosynthesis? It
   A. Gives off hydrogen as waste product C. splits water molecules into water and oxygen
   B. Supplies oxygen for synthesis of carbohydrates D. Occurs outside chloroplasts.
9. In experiments dealing with photosynthesis, the liquid that is used to absorb carbon dioxide is
   A. Iodine solution B. methylene blue solution C. potassium hydroxide D/ sodium chloride
10. Which of the following is the effect of light shining on plant stem from one side? Light from one side:-
   A. diffuses auxin to the illuminated of the stem
   B. does not have any role in the distribution of auxin in the plant stem
   C. makes equal distribution of auxin in the plant stem
   D. Diffuses auxin into the dark side of the stem.
11. At what condition do the rate of transpiration is high?
   A. when the rate of evaporation is low C. in cold humid condition
   B. In rainy season D. in dry and windy condition.
12. Which of the following plant hormone is involved in tropism?
   A. Auxin B. Cytokinin C. Abscisic acid D. Gibberellic acid.

Item number 13 is based on the following information about two seeds.

Seed A has epigeal germination Seed B has hypogeal germination**.**

13. Which of the following is correct about seed A and B? During germination:
   A. Seed A cotyledon is below the soil surface B. seed A plumule is above the soil surface
   B. Seed B plumule is below the soil surface D. seed B cotyledon is above the soil surface.
14. The major gas exchange tissue of a plant leaf is the
   A. Palisade mesophyll B. spongy mesophyll C. vacuole D. stomata.
15. Which of the following statements is true about photosynthesis?
   A. Photosynthesis contributes for the increase of world's temperature
   B. Photosynthesis converts chemical energy into light energy
   C. photosynthesis is the ultimate source of energy for the earth
   D. Photosynthesis can be processed by some large animals.
16. Which of the following ingredients are required to undergo photosynthesis by a leaf?
   A. Carbon dioxide, oxygen and chlorophyll B. oxygen, water and chlorophyll
   B. Carbon dioxide, glucose and chlorophyll D. carbon dioxide, water and chlorophyll.
17. Why do plants convert their primary product of photosynthesis, glucose to starch? Because:
   A. Starch is important for making cell wall of plants
   B. Large amount of glucose becomes toxic for plants

C. Starch does not affect the water balance
D. Glucose cannot be used for respiration directly.

18. Suppose your garden in the open field shows very slow growth despite the sufficient amount of water you provide it. What do you suggest as the most probable reason for this problem?
A. The plants lack chlorophyll to trap light C. the soil may lack enough nutrients
B. The plants do not receive enough light D. the plants do not receive enough CO_2.
19. Which of the following plant structures is attacked by insect pests such as aphides?
A. Xylem B. epidermis C. phloem D. pith.
20. Which of the following is correct about a seedling horizontally fixed on a rotating clinostat?
A. The root grows upwards while the shoot grows down wards
B. Both the shoot and root continue to grow straight
C. Both the shoot and stop growing
D. The root grows down wards while the shoot grows upwards.
21. What is the impact of transpiration on agricultural plants?
A. Very low transpiration increases the growth of agricultural plants
B. Higher transpiration decreases the activities of agricultural plant cells
C. Higher transpiration increases the chance of growth of agricultural plants
D. High transpiration rate increases the chance of agricultural plants wilting.
22. Which of the following is true about tropism?
A. Root is positive to phototropism C. shoot is positive to phototropism
B. Shoot is positive to geotropism D. root is negative to geotropism.
23. A gaseous plant hormone which causes fruit ripening is?
A. Gibberellic acid B. Ethylene C. Abscisic acid D. Cytokinin.
24. Which one of the following is true about the function of stomata?
A. Allows water to diffuse into the leaf C. allows oxygen to diffuse into the leaf
B. Allows carbon dioxide diffuse out the leaf D. allows carbon dioxide to diffuse into the leaf.
25. The most important reaction on earth that converts light energy into chemical energy which available for life is A. anabolism B. respiration C. photosynthesis D. catabolism.
26. Photosynthesis balances the atmospheric carbon dioxide by
A. Adding excess carbon dioxide into the atmosphere
B. Removing excess carbon dioxide from the atmosphere
C. Reacting with water in the air D. reacting with nitrogen in the air.
27. The type of response by which roots grow towards water is:-
A. Nitro tropism B. Hydrotropism C. Phototropism D. Geotropism.
28. A green pigment of a leaf that absorbs light energy from the sun is:-
A. Ethylene B. chlorophyll C. Auxin D. Chloroplast.
29. Auxin (IAA) is a plant hormone which stimulates plant elongation. What will happen if it is removed from the tip of the plant? The plant
A. Grows from the side B. Increases in height C. stops growth D. will die.
30. The structure of the leaf where there are lots of air spaces and a big surface area for gas exchange is
A. Palisade mesophyll B. spongy mesophyll C. lower epidermis D. upper epidermis
31. Which of the following is NOT a tropic response in plants?
A. Phototropism B. Geotropism C. nitro tropism D. hydrotropism
32. The young shoots which are often used in experiments on tropisms are known as:
A. coleoptiles B. adventitious roots C. cotyledons D. cornucopia
33. Which of the following is NOT a plant hormone?
A. IAA B. gibberellin C. Abscisic acid D. Hydrolase
34. The oxygen released during photosynthesis directly came from:-
A. Carbon dioxide B. glucose C. water D. mineral
35. What is needed in photosynthesis to convert carbon dioxide into organic molecules?
A. Light and hydrogen from the splitting of water C. ATP and hydrogen from the splitting of water

B. ATP and oxygen from the splitting of water D. Light and oxygen from the splitting of water

36. Which of the following is not considered a limiting factor in photosynthesis?
    A. temperature B. water C. light intensity D. concentration of carbon dioxide
37. Which of the following is an indirect way of measuring the rate of photosynthesis?
    A. production of oxygen B. increase in biomass C. uptake of carbon dioxide D. all of the above
38. What does the chloroplast do during the process of photosynthesis?
    A. Stores water B. Moves the energy in to the cell C. controls cellular activity D. Transport glucose
39. The reactants and products of photosynthetic reaction respectively are?
    A. Carbon dioxide and water: water and glucose
    B. Glucose and water : oxygen and water
    C. Sunlight and water : carbon dioxide and water
    D. Carbon dioxide and water : oxygen and glucose
40. The chemical equation for photosynthesis
    A. 6CO2 + 6O2 --->using sunlight ---> C6H12O6 + 6H2O
    B. 6CO2 + C6H12O6 --->using sunlight ---> 6H2O + 6O2
    C. 6CO2 + 6H2O --->using sunlight ---> C6H12O6 + 6O2
    D. 6O2 + 6H2O --->using sunlight ---> C6H12O6 + 6CO2
41. Holes in plant leaves that allow carbon dioxide to enter and oxygen to leave.
    A. Chloroplast B. Stomata C. Chlorophyll D. Roots
42. During light reaction in photosynthesis the following are formed:
    A. ATP and sugar B. H_2, O_2 and sugar C. ATP, H_2 and O_2 D. ATP, H_2 and O_2 donor
43. Dark reaction in photosynthesis is called so because
    A. It can occur in dark also C. It does not depend on light energy
    B. It cannot occur during day light D. It occurs more rapidly at nigh

UNIT 5
Conservation of natural resources

Natural resources:- are resources that supplied by nature**.** There are two types of natural resources

A. Renewable } Natural resources
B. Non renewable

Q. What are examples of natural resources in Ethiopia?
Q. Compare and contrast renewable and non-renewable natural resources?
Q. Write example for each renewable and non-renewable natural resources

Conservation and biodiversity

Biodiversity:- the diversity of plants and animals in a particular habitat or in the world as a whole
Why is biodiversity so important? It increases:-

- Food chain and food web
- Health of planet
- The genetic diversity

Q. What is monoculture? What value does it have in biodiversity?
Conservation:- the preservation and wise management of the environment and of a natural resources
Q. What are different ways of conservation of biodiversity?

Vegetation

Vegetation is the plant life in a particular region. There are rich and varied vegetation in Ethiopia
We have ecosystems which vary from desert to tropical rainforests. The vegetation across our country changes dramatically with the conditions
Different vegetation that are found in Ethiopia includes:-

Tropical rain forest
Savanna grass land
Deciduous woods
Tropical bush

Human effect on vegetation

Human being have influenced vegetation in different ways
This include:-

-Deforestation- removing tree for different reasons
-Agricultural expansion
-Fire wood collection
- Grazing

This all reduce the biodiversity of the vegetation and often destroys the structure of the soil. This again may result in different environmental problems like:-

-Desertification
-Global warming
- poisoning of environment

Endemic species

Endemic species:- are species which are native or confined to a certain region
Ethiopia is a country which is internationally recognized for its rich diversity of plant species
There are around 800 endemic plants Ethiopia.
Examples of our endemic species include:-

- Teff (Eragrostis teff)
- Euphorbia spps
-Noug or Niger seed (Guizotia abyssinica)
-Enset (Ensete ventricosum)
-Ficus vasta Forssk
-kererro
-sembo trees
-Zigba
-Juniper (Tid)

Wildlife

Are all animals (except people) that are not domesticated. The wildlife of Ethiopia is some of the richest in the world. We have 242 listed mammalian species. There are around 862 species of birds

Insects are another important aspect of Ethiopian wildlife
Wildlife is useful to people in a number of ways:-

- Insects used as pollinators
- Bees provide the hone
- Acts as a genetic bank for our domestic animals
- Generate income from tourism

There are a high number of endemic species of different types of wildlife in Ethiopia
Ex. there are 28 species of mammals, which include:-

-Gelada Baboon
- Walia ibex
- Menelik's Bushbuck
- Mountain Nyala
- Swayne's Hartebeest
- Ethiopian wolf

Endemic bird species include:-

- heavy-headed
- wattled ibis
- thick-billed raven
- black winged lovebird
- white-collared pigeon
-Prince Ruspolis Turaco

Conservation of wildlife

There are different ways of conservation of wildlife
Conservation involves:-

-protecting habitats and managing populations
-preventing the spread of disease

Wild life also conserved in Parks or Sanctuaries. There are a number of National Parks in Ethiopia
A National Park is a relatively large area of land which is owned by the Government and is set aside for the protection of vegetation and wildlife and for their appreciation by human beings. National Parks contain several ecosystems which are not affected by human activities.
The main National Parks of Ethiopia are:-

-Abijatta-Shalla Lakes National Park
-Awash National Park
-Bale Mountain National Park
-Gambela National Park
-Rift Valley Lakes National Park
-Mago National Park
-Omo National Park
-Nechisar National Park
-Simien Mountains National Park
-Yangudi Rassa National Par

Ethiopia also have a number of wildlife sanctuaries which are similar to National Parks but focus on the conservation of particular species
These include:-

-Harar Wildlife
- Kuni-Muktar Mountain Nyala
- Senkelle Swayne's Hartebeest
- Yabalo wild life

} sanctuary

Air

Clean air is essential for our bodies to live as it supplies the oxygen for cellular respiration

We breathe air into and out of our lungs all the time from our birth to our death. But air we breathe in is not always clear.There are other substances released that pollute the air and are harmful to humans, plants and animals. These are called **pollutants**. Pollution is the contamination of the natural environment by harmful substances as a result of human activities

What is in air pollution?

Is a contamination of air by different pollutants. One type of air pollution is smoke produced by burning fossil fuel for energy. Fossil fuels contain chemicals known as hydrocarbons

When fuels are burned, small particle are released into the air causing local air pollution.

Smoke pollution worldwide is thought to be causing global dimming, blocking out some of the light from the sun. Another is production of Co2. It is produced from burning of wood and fuels or from respiration of living organisms. This result in increase of Co2 in the air. Increased level of Co2 with methane, act as blanket and trap heat close to the surface of the earth. This result in Global warming

REVIEW QUESTION ON UNIT FIVE

1. Which of the following natural resources is different from others?
   A. Coal B. Natural gas C. Wood D. Gold.
2. Which of the following activities increases the biodiversity of our country?
   A. Cultivation of a single crop C. replanting of forests
   B. Burning of fossil fuels D. cutting trees for timber.
3. Air pollution by chlorofluorocarbon (CFCs) has caused
   A. Global cooling B. ozone hole C. acid rain D. Volcanic eruptions.
4. Which of the following plants is not endemic to Ethiopia?
   A. Teff B. Enset C. Zigba D. Maize.
5. Which of the following gases result in global warming when accumulated in the atmosphere?
   A. Carbon dioxide B. Oxygen C. Hydrogen D. Nitrogen.
6. Biodiversity refers to:-
   A. the variety of living things on the planet earth
   B. all the natural resources we have on the planet earth
   C. identifying and scientifically describing species of living things
   D. Sustainable use and protection of natural resources.
7. Which of the following is correct about renewable resources? Renewable resources
   A. do not require careful management C. if used cannot replaced
   B. Can be used, reused and replaced D. Include gold, iron and fuel.
8. How does monoculture affect biodiversity? It replaces
   A. A biodiversity rich area by a bare land C. one species by another species
   B. One species by many species D. a biodiversity rich area by a single crop plant.
9. Which of the following has a positive effect on our local vegetation?
   A. Random introduction of exotic species C. replanting the land with endemic species
   B. Non sustainable production of timber for export D. rapid harvesting without replanting.
10. How do predators contribute in conserving our vegetation?
    A. By feeding on specific species of plants C. by keeping down the number of herbivores
    B. By feeding on un important weeds D. by eradicating herbivores from an area.
11. Which of the following is the effect of depletion of ozone layer?
    A. Easy access of ultraviolet radiation to humans C. intensification of global warming
    B. High frequency of acid rain D. oxygen deficiency in the atmosphere.
12. Which of the following plant is not endemic to our country?
    A. Noug B. Coffee C. Sembo D. wheat
13. Which of the following methods is used to conserve wild life?
    A. Mixing wild life with domestic species B. allowing poaching for economic use

B. Shifting their habitat and niche D. setting national parks and sanctuaries.

14. Which of the following activities mainly causes global warming?
    A. Burning of fossil fuels C. afforestation of the habitat
    B. Reducing the number of livestock D. reducing the amount of rice farms.
15. Which of the following animals is particularly found in Nechisar national park?
    A. Gelada Baboon B. Walia ibex C. Crocodile D. Mountain Nyala.
16. Which of the following statement is true about conservation? It
    A. reduces exotic plants and animals C. reduces the number of species
    B. Protects our environment D. protects our sanitation.
17. What is the importance of vegetation? It can be used
    A. For balancing of nitrogen oxides C. for balancing of sulphur dioxide
    B. As source of acid rain D. as source of food.
18. Suppose a tourist is interested to study the variety of birds in Ethiopia. To which part of Ethiopia would you advise him to go?
    A. Ogaden region B. Rift valley lakes C. Bale mountain D. Semien mountain.
19. An animal or plant species restricted in the political boundary of a given country is known as
    A. extinct species B. Endangered species C. indigenous species D. Endemic species.
20. Which of the following combination contain all ecdemic plants of Ethiopia?
    A. Semba, zigba, tid B. enset, semba, zigba C. wheat, bahir zaf , maize D. Tid, zigba, noug
21. Which of the following is the most abundant gas in the Earth's atmosphere?
    A. Oxygen B. Nitrogen C. Argon D. Hydrogen
22. Who worked more to increase the record of indigenous trees particularly at National Herbarium?
    A. Dr. Mesfin Tadesse B. Prof. Legesse Negash C. prof. Hisermu Kelbessa D. prof. Endirias
23. Which of the following is a non-renewable resource? A. eggs B. Teff C. Sweet potato D oil
24. The main contributor gases for acid rain are:- A. sulphur dioxide and carbon mono oxide
    B. nitrogen oxide and carbon dioxide C. carbon dioxide and carbon mono oxide
    D. sulphur di oxide and nitrogen oxide
25. Which of the following is a Sanctuary rather than a National Park in Ethiopia?
    A. Gambela B. Senkelle C. Yangudi D. Mago
26. Which of the following statements does not explain why biodiversity is important?
    A. Biodiversity produces genetic variety B. Biodiversity maintains the balance of an ecosystem.
    C. Biodiversity reduces the spread of disease. D. Biodiversity establishes a monoculture
27. Which of these is not an example of how humans can affect the natural vegetation?
    A. classification B. deforestation C. Burning D. Farming
28. Ethiopian National Park which is characterized by dry and dormant volcano is?
    A. Abijatta-shalla Lakes NP. B. Mago NP C. Awash NP D. Rift Valley Lakes NP
29. Which of the following is not an endemic Ethiopian species of animal?
    A. Mountain Nyala B. Ethiopian wolves C. Gelada Baboon D. Roan Antelope
30. Which of the following National Parks of Ethiopia is particularly known for the existence of Giant Mole Rat?
    A. Bale Mountain NP B. Awash NP C. Rift Valley NP D. Gambela NP
31. Which of these pollutants causes most problems in Ethiopian homes?
    A sulphur dioxide B. carbon dioxide C benzene, lead and soot D nitrogen oxides
32. Which of the following is not true about National Parks and Sanctuaries of Ethiopia?
    A. Omo National Park B. Harar Wild life National Park C. Yabalo wild life Sanctuary D. Mago NP
33. National Parks are mainly differ from Sanctuaries in that:- National Parks
    A. may be larger than Sanctuaries B. may be slower than Sanctuaries
    C. may contain a single species D. may contain varieties of species
34. The p^H of normal rain and acid rain is respectively about?
    A. 7 and 2 B. 7 and 5 C. 5 And 4 D. 5 and 2
35. Rain water is slightly acidic than ground water, this is mainly because,
    A. rain water contain more carbon monoxide C. Rain water contain more sulfur dioxide

B. Rain water contain more carbon dioxide D. Rain water contain more nitrogen dioxide

36. Green House gas is: A. Nitrogen B. Oxygen C. Methane D. Carbon di oxide

37. Among the list of Emperors given below, who is highly accredited for conservation of vegetation?
A. Zera Yakob B. Minelik II C. Haileseliase D. Tayitu Batul

38. Among the list of Emperors given below, who introduced Bahirzaf for the first time in Ethiopia?
A. Zera Yakob. B. Tayetu Batul. C. Haileseliase D. Minelik II

39. The correct arrangement of Ethiopian National Parks listed below from smaller to larger one is?
A. Abijatta Shalla Lakes NP→Omo NP→Mago NP B. Omo NP→ Mago NP→ Abijatta Shalla Lakes NP
C. Mago NP→ Abijatta Shalla Lakes NP→ Omo NP D. Abijatta Shalla Lakes NP→ Mago NP→ Omo NP

ANSWER KEY FOR REVIEW QUESTIONS

ANSWER FOR UNIT THREE

S.NO	ANS	S.NO	ANS	S.NO	ANS	S.NO	ANS
1	C	11	C	21	A	31	C
2	C	12	D	22	A	32	B
3	B	13	B	23	D	33	B
4	D	14	B	24	B	34	B
5	B	15	A	25	B	35	D
6	A	16	A	26	D	36	A
7	D	17	A	27	A	37	B
8	A	18	C	28	B	38	C
9	B	19	C	29	C	39	D
10	B	20	B	30	A	40	B
						41	B
						42	C
						43	D
						44	B
						45	D

ANSWER FOR UNIT FOUR

S.NO	ANS	S.NO	ANS	S.NO	ANS	S.NO	ANS
1	C	11	C	21	C	31	C
2	D	12	A	22	C	32	A
3	C	13	B	23	B	33	D
4	D	14	D	24	D	34	C
5	A	15	B	25	A	35	A
6	B	16	D	26	C	36	A
7	C	17	C	27	B	37	D
8	C	18	C	28	B	38	D
9	C	19	C	29	B	39	B
10	D	20	D	30	B	40	D
						41	C
						42	B
						43	C
						44	C

ANSWER FOR UNIT FIVE

S.NO	ANS	S.NO	ANS	S.NO	ANS	S.NO	ANS
1	C	11	A	21	B	31	B
2	C	12	D	22	B	32	B
3	B	13	B	23	D	33	A
4	B	14	A	24	D	34	D
5	A	15	C	25	B	35	B
6	A	16	B	26	D	36	A
7	B	17	D	27	A	37	A
8	D	18	B	28	C	38	D
9	C	19	D	29	D	39	D
10	C	20	C	30	A	40	