

**MAHESH TUTORIALS I.C.S.E.**

GRADE - X (2015-2016)

Exam No. : MT/ICSE/PRELIM -I- SET B - 006

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**BIOLOGY****SCIENCE PAPER - 3***(One hour and a half)*

*Answers to this Paper must be written on the paper provided separately.*

*You will **not** be allowed to write during the first 15 minutes.*

*This time is to be spent in reading the Question Paper.*

*The time given at the head of this paper is the time allowed for writing the answers.*

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*Attempt **all** questions from **Section I** and **any four** questions from **Section II**.*

*The intended marks for questions or parts of questions are given in brackets [ ].*

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**SECTION – I (40 Marks)**

*Attempt **all** questions from this section.*

**Question 1.****(a) Name the following :****[5]**

- (i) The three conditions necessary for photosynthesis to occur.
- (ii) A structure in the ovary carrying a centrally placed ovum surrounded by several layers of granular cytoplasm.
- (iii) A fluid which acts as a shock-proof cushion for the brain and spinal cord and keeps them moist.
- (iv) A gland consisting of two lobes, placed on either side of trachea in the neck region.
- (v) A hormone which helps in conserving body water.

**(b) Choose the odd one out from each of the following sets, giving the reason for your choice :****[5]**

- (i) Chlorophyll, mesophyll, carotenes, xanthophyll.
- (ii) Pellagra, Beri-beri, Kwashiorkor, Scurvy.
- (iii) Lateral horn, central canal, pons, dorsal ganglion.
- (iv) Presynaptic membrane, postsynaptic membrane, basilar membrane.
- (v) Glucose, insulin, fats, proteins.

- (c) Select one suitable word or words from the three alternatives given to fill in the blanks in the following sentences :** [5]
- (i) Diffusion is the movement of substances from an area of their higher concentration to an area of lower concentration by \_\_\_\_\_ movement of molecules (random, regular, in a set pattern)
  - (ii) \_\_\_\_\_ is a genetic disorder characterised by 45 chromosomes having (X) on the sex chromosomes.  
(Klinefelter's syndrome, Turner's syndrome, Down's syndrome)
  - (iii) Oestrogen, progesterone and gonadotropin hormones are \_\_\_\_\_.  
(female sex hormones, hormones, male sex hormones).
  - (iv) The condition in which RBCs are produced in excess amount is \_\_\_\_\_.  
(homeostasis, erythropenia, polycythaemia)
  - (v) \_\_\_\_\_ is the spot in retina which consists of maximum cone cells.  
(Macula lutea, blind spot, choroid)
- (d) Draw a neat and labelled diagram of Human sperm.** [5]
- (e) Answer the following questions :** [5]
- (i) How is the sense of depth perceived? Explain.
  - (ii) What kind of image is formed on the retina?
  - (iii) What is meant by the term short-sightedness?
  - (iv) Name the parts of which the inner ear is constituted of.
  - (v) How is the static balance of the body maintained?
- (f) State whether the statements are true or false. If false, rewrite the correct statement by changing the first or the last word only :** [5]
- (i) Blind spot contains maximum number of sensory cells.
  - (ii) Clitoris in female is equivalent to male penis.
  - (iii) During day time, as a result of photosynthesis, concentration of carbohydrates falls.
  - (iv) The phenomenon by which living or dead cells of plants in their dry or semi-dry state absorb water surface attraction is known as diffusion.
  - (v) In dark reaction of photosynthesis, a part of PGA undergoes a series of reactions to produce RUL.
- (g) Give the exact location and function of each of the following structural substances :** [5]
- (i) Amniotic fluid
  - (ii) Tympanic membrane
  - (iii) Adrenal gland
  - (iv) Vitreous chamber
  - (v) Chlorophyll

- (h) **Given below is an example of a certain structure or substance and the special functional activity which it is concerned.** [4]

Plasma membrane and semi-permeability.

On a similar pattern, fill in the blanks in the following pairs to represent relationship between the structure and their special functional activity.

- (i) Circular muscles of the iris and \_\_\_\_\_.
- (ii) Spinal cord and \_\_\_\_\_.
- (iii) Bringing sense of smell and \_\_\_\_\_.
- (iv) Maturation of sperms and \_\_\_\_\_.
- (v) Hypothalamus and \_\_\_\_\_.

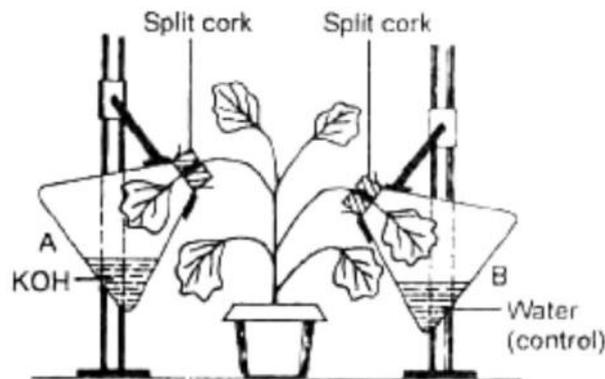
### SECTION – II (40 Marks)

Attempt **any four** questions from this section.

#### Question 2

- (a) **A plant is destarched by keeping it in dark for 48 hours and then set up as shown below. The conical flask is made completely air-tight by smearing the split cork with vaseline or wax.** [5]

The apparatus is kept in sunlight. After 7 hours, the leaves are detached in A and B and tested for starch.



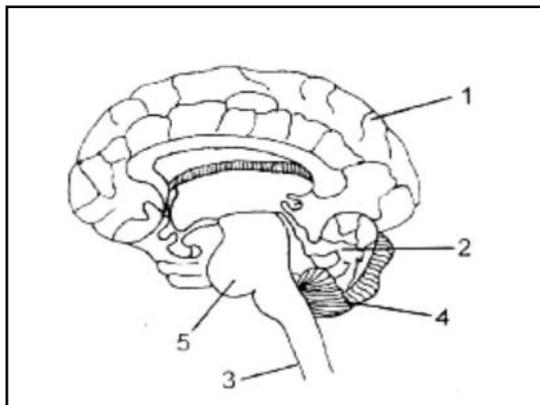
- (i) What happens to the leaves present in A and B?
- (ii) Why is KOH kept in flask A?
- (iii) Write the aim of the experiment.

- (b) **Define the following terms.** [5]

- (i) Ascent of sap.
- (ii) Grana.
- (iii) Immunity.
- (iv) Menarche
- (v) Active Transport

**Question 3**

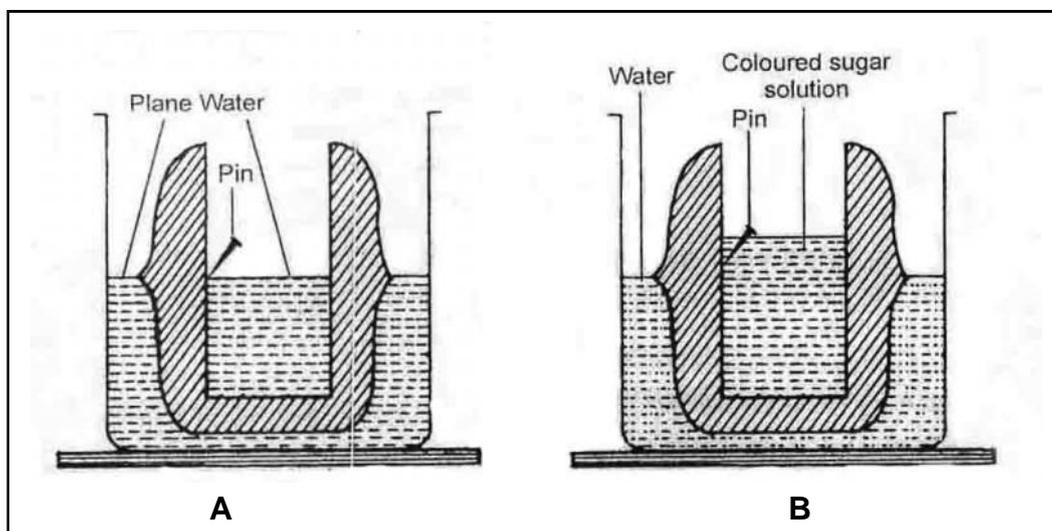
(a) Following is a diagram showing external view of a human brain. Study the same and answer the questions that follow. [5]



- (i) Label the guidelines from 1 to 5.
  - (ii) Give the difference between functions of thalamus and hypothalamus.
- (b) (i) Explain the terms 'anterior' and 'posterior' chambers in the human eye.  
 (ii) The human eye is different from a camera in the sense that it can adjust its focal point. Explain. What is accommodation?

**Question 4**

(a) The following figures show the demonstration of osmosis by potato osmoscope. Study the figures and answer the following questions.



- (i) Why does the level of water rise in B after some time?
- (ii) Give definitions of hypertonic, isotonic and hypotonic solution in relation to cell-sap.
- (iii) Give two differences between diffusion and osmosis.

[5]

**(b) Give the difference between :**

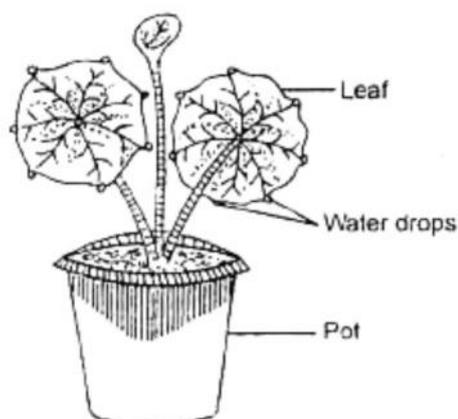
**[5]**

- (i) Antiseptics and Disinfectants.
- (ii) Examples of killed germs and living weakened germs as vaccines.
- (iii) Biosynthetic Phase and Photochemical Phase.
- (iv) Menarche and menopause
- (v) Mitosis and Meiosis.

**Question 5**

**(a) The following figure shows a potted plant. Observe the figure and answer the questions that follow.**

**[5]**



- (i) What phenomenon in plants is being shown in the figure and why?
- (ii) Explain the phenomenon shown here.

**(b) Draw a labelled diagram of endocrine glands in human body.**

**[3]**

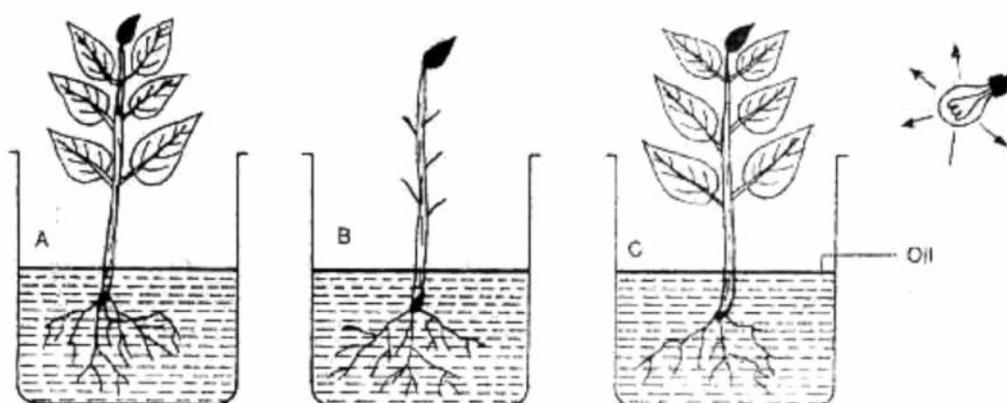
**(c) Explain : Transpiration is the price which a plant pays for photosynthesis.**

**[2]**

**Question 6**

**(a) Three plants A, B and C are placed in a beaker containing coloured water. The water in each beaker is covered with a layer of oil. Plant A is left intact; while leaves are removed from plant B. Plant C is exposed to strong light.**

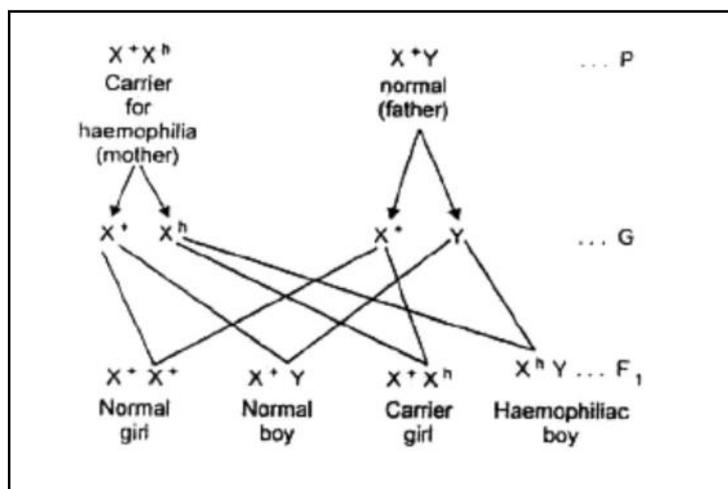
**[5]**



- (i) In which plant A, B or C. would water move up the fastest?  
 (ii) In which plant would water move slowly?  
 (iii) Why is water covered with oil?  
 (iv) What is the purpose of this experiment?
- (b) (i) List the changes occur during the light and dark adaptation.  
 (ii) Where is the vision least in the eye? Why is it called the blind spot?  
 (iii) Where is the vision best in the eye? Why is it so?  
 (iv) Define Siamese twins.  
 (v) Give one difference between plasmolysis and deplasmolysis.

### Question 7

- (a) Following is the representation of a cross showing inheritance of haemophilia in human. Study and answer the following. [5]



- (i) What is the ratio of normal boy and haemophiliac boy?  
 (ii) What is the phenotypic ratio of normal and haemophiliac offspring?  
 (iii) What is haemophilia?
- (b) Give biological reasons for the following : [5]
- (i) Why is the rate of guttation not regulated?  
 (ii) The roots of some plants are seen growing through walls and crevices.  
 (iii) A closed can of dried seeds bursts open if some water enters it by accident.  
 (iv) The leaflets of sensitive plant touch-me-not (*Mimosa-pudica*) droop down on touching.  
 (v) Nerve cells never divide.

*All the Best* 🍀

# MAHESH TUTORIALS I.C.S.E.

ICSE X

SUBJECT : **BIOLOGY**

Marks : 80

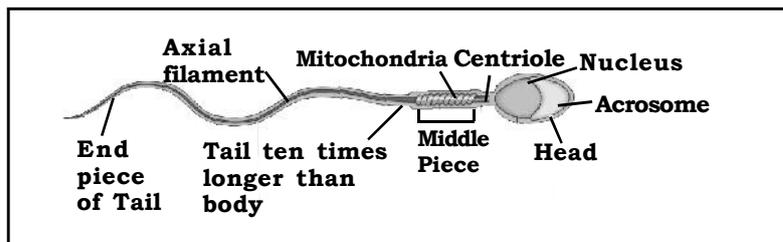
Exam No. : MT/ICSE/PRELIM -I-SET B-006

Time : 1½ hrs.

## Model Answer Paper

<b>SECTION – I (40 Marks)</b> <i>Attempt <b>all</b> questions from this section.</i>		
<b>A.1</b>		
<b>(a)</b>	(i) Water, light and chlorophyll. (ii) Ovarian follicle. (iii) Cerebrospinal fluid. (iv) Thyroid gland. (v) Vasopressin.	1 1 1 1 1
<b>(b)</b>	(i) <b>Mesophyll</b> : Mesophyll is the tissue found between the upper and lower epidermis of the green leaf whereas all others are different kinds of pigments found in the plants. (ii) <b>Kwashiorkor</b> : It is a protein deficiency disease whereas others are vitamin deficiency diseases. (iii) <b>Pons</b> : It is a part of the brain whereas all others are parts of spinal cord. (iv) <b>Basilar membrane</b> : Presynaptic and postsynaptic membrane are the parts of synapse, whereas basilar membrane is the part of inner ear which helps in the vibration and transmission of sound. (v) <b>Insulin</b> : It is a hormone whereas all others are different kinds of food materials.	1 1 1 1 1
<b>(c)</b>	(i) Diffusion is the movement of substances from an area of their higher concentration to an area of lower concentration by <b>Random</b> movement of molecules. (ii) <b>Turner's syndrome</b> is a genetic disorder characterised by 45 chromosomes having (X) on the sex chromosomes. (iii) Oestrogen, progesterone and gonadotropin hormones are <b>female sex hormones</b> . (iv) The condition in which RBCs are produced in excess amount is <b>polycythaemia</b> . (v) <b>Macula lutea</b> is the spot in retina which consists of maximum cone cells.	

(d)



(e)

- (i) We have the ability to perceive depth or the relative distance of the object due to simultaneous focussing of an object in both the eye. The brain correlates the two images and interprets them as a single impression. The result is a three-dimensional effect. It is also called as stereoscopic or binocular vision.
- (ii) Inverted and real.
- (iii) It is an eye defect in which a person can see nearby things clearly but distant things are blurred.
- (iv)
  1. Cochlea
  2. Semi-circular canals and
  3. Vestibule
- (v) The three semicircular canals and the utricle function as balancing organs. These organs are filled with endolymph. Endolymph moves when we change position and touches the sensory hair which sends the stimulus to brain.

(f)

- (i) False  
**Corrected statement** : Yellow spot contains maximum number of sensory cells.
- (ii) True.
- (iii) False  
**Corrected statement** : During day time, as a result of photosynthesis, concentration of carbohydrate rises.
- (iv) False.  
**Corrected statement** : The phenomenon by which living or dead cells of plants in their dry state absorb water by surface attraction is known as imbibition.
- (v) True

(g)

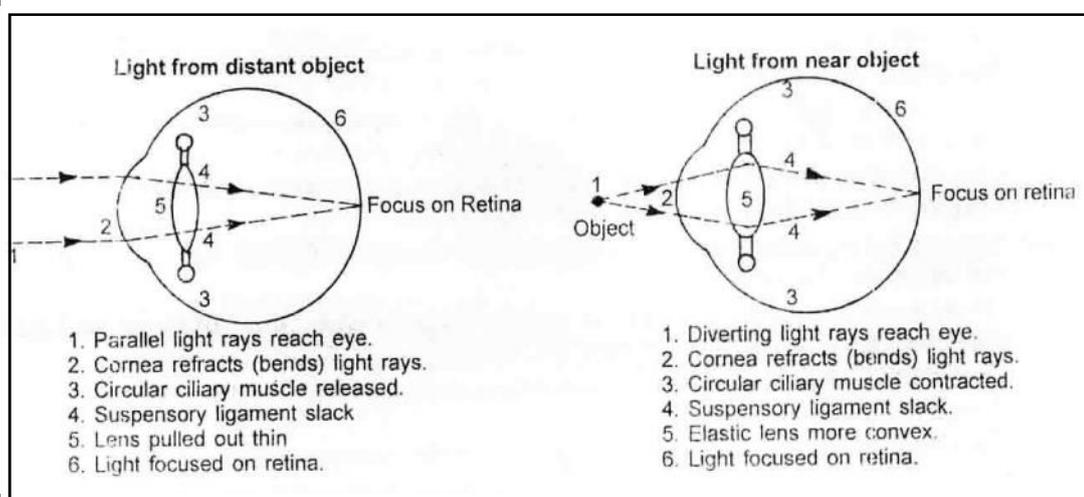
- (i) Location - Inside the amnion in the uterus.  
Function - It acts as a cushion and shock absorber for the embryo,
- (ii) Location : Stretched tightly between the outer and the middle ear.  
Function : It allows only the sound waves striking it to pass into the middle ear by vibrating, and not else.
- (iii) Location : Adrenal gland is located at the top of each kidney.  
Function : Secretes adrenaline and nor-adrenaline hormones.
- (iv) Location : A cavity of the eye filled with vitreous humour located posterior to the crystalline lens anterior to the retina.  
Function : Helps in maintaining the shape of eye ball and protects retina and its nerve endings.

	<p>(v) Location : Located in the inner walls of thylakoids. Function : Traps sunlight for carrying out photosynthesis.</p>	
	<p>(h) (i) Controls the size of pupil. (ii) Transmitting impulses to and from brain, also acting as reflex centre. (iii) 1st Cranial nerve (olfactory nerve.) (iv) Epididymis. (v) Controlling reflex responses.</p>	
	<p><b>SECTION – II (40 Marks)</b> <i>Attempt <b>any four</b> questions from this section.</i></p>	
<b>A.2</b>		
<b>(a)</b>	<p>(i) The leaf in flask A will not turn blue black on treating with iodine, since the leaf has not been able to manufacture food (starch) due to the absence of CO<sub>2</sub>. But the leaf in flask 'B' turns blue black on treatment with iodine, as the flask has CO<sub>2</sub> in it. (ii) KOH is kept in flask A to absorb the CO<sub>2</sub> present in it. (iii) The aim of the experiment is to demonstrate that CO<sub>2</sub> is necessary for photosynthesis.</p>	
<b>(b)</b>	<p>(i) The Upward transport of water (alongwith dissolved inorganic mineral salts) from roots to aerial parts of the plant. (ii) Lying freely in the stroma in the matrix of the chloroplast are systems of chlorophyll bearing double membraned sacs or lamellae stacked one above the other. These are grana, also known as thylakoids. (iii) Immunity is defined as body's resistance to diseases. (iv) Menarche is the onset of menstruation in a young female between the age of 13 - 15 years. (v) The passage of solute ions from their lower concentration to higher concentration using cell's energy across a semi-permeable is known as Active transport.</p>	
<b>A.3</b>		
<b>(a)</b>	<p>(i) 1. Cerebrum 2. Cerebellum 3. Spinal cord 4. Medulla oblongata 5. Pons Varoli (ii) Thalamus : Contains ascending and descending tracts linking forebrain with spinal cord. Hypothalamus : Largely controls the pituitary gland; seat of basic emotions or 'drives' such as thirst, fear, rage and sex.</p>	
<b>(b)</b>	<p>(i) <b>Anterior chamber</b> : The space between the iris and cornea is called anterior chamber, while that between iris and front of lens is known as posterior chamber. These chambers are filled by a thin fluid called aqueous humour. The part of the eyeball behind the lens is filled by</p>	

a jellylike substance known as vitreous humour. The aqueous humour supplies nutrients (like glucose) and removes products of metabolism (like lactic acid) from the lens and cornea. Due to the constancy of the of aqueous humour, the eyeball remains rigid.

- (ii) The human eye is able to change its focal point by changing the shape of the lens in accordance with the object being viewed is from the eye. The lens is connected via suspensory ligaments to ciliary muscles that contract to flatten the lens and relax to make the lens more convex. When the eye is to view object, the ciliary muscles contract to give the lens a flatter shape. When the object to be viewed in the ciliary muscles relax and the lens returns, by its own elastic recoil, to its natural convex shape.

**Accommodation** : Adjustment of the eye for a clear vision of objects at different distances is called accommodation.



- (iii) Hormones are mainly of two types —

1. Protein hormone
2. Steroid hormone.

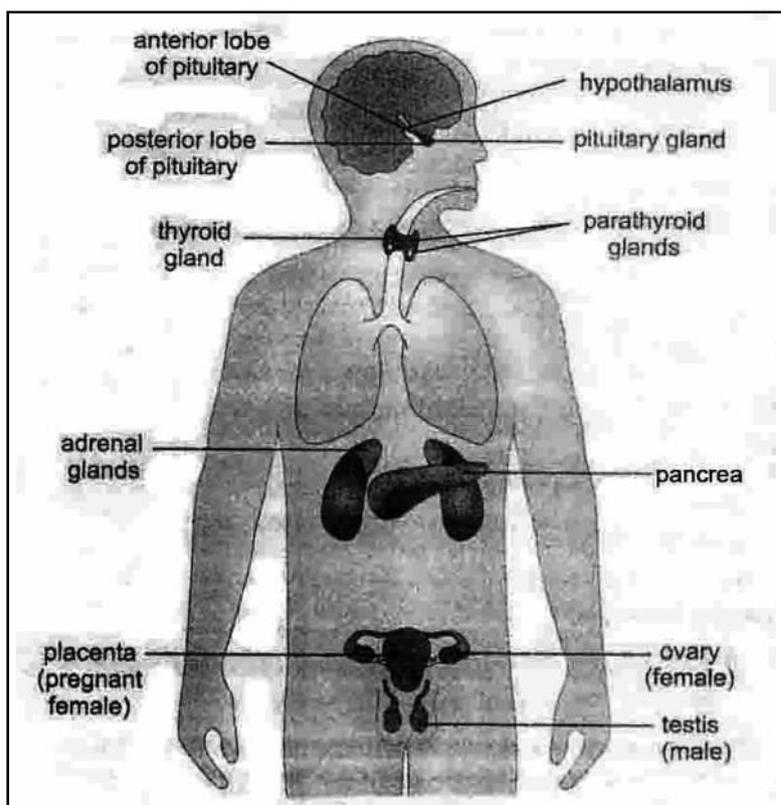
#### A.4

- (a) (i) The osmometer (potato) contains sugar solution of higher concentration than the water in the beaker outside. Therefore, after some time, the water starts entering the osmoscope to equalise the concentration on both the sides resulting in rise in the level as shown in B.
- (ii) **Hypertonic solution** : It is a solution in which the osmotic concentration is more than that of cell sap.  
**Isotonic solution** : It is a solution in which osmotic concentration is similar to cell sap.  
**Hypotonic situation** : It is a solution in which concentration is less than the cell sap.
- (iii) The two differences are :
1. Diffusion takes place in solid, liquid or gases whereas osmosis occurs only in liquid medium.

<p><b>(b)</b></p>	<p>2. Diffusion does not require the presence of a semi-permeable membrane. But osmosis occurs through a semi-permeable membrane only.</p>		
	<p><b>Antiseptics</b></p>	<p><b>Disinfectants</b></p>	
	<p>(i) They are mild chemical substances applied on body to kill germs.</p>	<p>(i) They are strong chemical substances applied on spots to kill germs.</p>	
	<p><b>(ii)</b></p>	<p><b>Killed germs vaccines</b></p>	<p><b>Living weakened germs</b></p>
		<p>Examples are TAB vaccine for typhoid, salk's for polio myelitis and vaccine for rabies.</p>	<p>Vaccine for measles and the freeze - dried BCG vaccine for tuberculosis</p>
	<p><b>(iii)</b></p>	<p><b>Biosynthetic phase</b></p>	<p><b>Photochemical Phase</b></p>
		<p>It does not require sunlight.</p>	<p>It requires sunlight.</p>
	<p><b>(iv)</b></p>	<p><b>Menarch</b></p>	<p><b>Menopause</b></p>
		<p>The onset of menstrual cycle in a female is known as menarch which occurs at the age o 10 to 14 years.</p>	<p>The end of the menstrual cycle is known as the menopause around 45 to 50 years of age</p>
	<p><b>(v)</b></p>	<p><b>Mitosis</b></p>	<p><b>Meiosis</b></p>
		<p>It occurs in somatic cells</p>	<p>It occurs in ser cells</p>
	<p><b>A.5</b></p>	<p><b>(a)</b></p> <p>(i) Guttation : water drops can be observed on the margin of the leaf at the end of the veins.</p> <p>(ii) In herbaceous plants when root pressure is high and transpiration is low, plants lose their extra water liquid drops from the margins of leaves. This loss of liquid is called guttation. This process is comm during humid nights. The gutlation water contains dissolved salts.</p>	

- (b) Following picture shows different endocrine glands in different parts of the body.

[5]



**A.6 (a)**

- (i) Water moves up fastest in plant C as transpiration is enhanced in the presence of light.
- (ii) Water moves slowly in plant B as there are no leaves and little or no transpiration takes place.
- (iii) Water is covered with oil as a precaution to prevent evaporation of water from the beaker, thus affecting the result.
- (iv) Transpiration and various factors controlling transpiration are being investigated by this experiment. Strong light increases the temperature which increases the rate of transpiration. The experiment also shows that transpiration mainly occurs through the leaves and if they are removed, absorption of water is inhibited.

- (b) (i) The major changes occurring in the eye during adaptation are as follows :

**Dark adaptation**

1. The pupils dilate to allow more light to enter the eye.
2. The pigment of the rods, visual purple, is regenerated.

**Light adaptation**

1. The pupils constrict to prevent entry of light into the eye.
2. The visual purple is bleached.

- (ii) Blind Spot — The area of no vision.

Just below the yellow spot is the blind spot. There are no sensory cells here, and therefore, this is a point of no vision. This is the point at which the nerve fibres from all the sensitive cells of the retina converge and bundle together to leave the eyeball in the form of the optic nerve.

<p>(iii)</p> <p><b>A.7</b></p> <p><b>(a)</b></p> <p><b>(b)</b></p>	<p>Yellow spot — The area of best vision. The distribution of rods and cones is not uniform. A particular spot called the macula or yellow spot (fovea centralis) lies at the back of the eye, almost at the centre at the horizontal axis of the eyeball. The contains the maximum number of sensory cells, particularly the cones. As a result, this is the region brightest vision and also of the colour vision. The rest of the retina has fewer cones and more rods. Yellow spot is the place of best vision of the normal eye. This is the reason why you move your eye word to word as you read a line through a printed page.</p> <p>(iv) The conjoined twins which are produced from one egg; twins who have failed to separate completely.</p> <p>(v) Plasmolysis : The shrinkage of protoplasm of a cell, when it is kept in hypertonic solution, is known as plasmolysis. Deplasmolysis : When the plasmolysed cell is kept in normal water, protoplasm returns to its original position. It is called deplasmolysis.</p> <p>(i) 1:1 (ii) 3:1 (iii) It is a recessive character and is, therefore, masked in heterozygous condition. Individuals suffering with this disease lack of factor responsible for clotting of blood. Since it is a recessive character, a lady may carry the disease and would transmit the disease to 50% of her sons, even if the father is normal.</p> <p>(i) The rate of guttation is not regulated as the openings of hydathodes have lost the power of movement as guard cells of stomata. (ii) Roots of some plants are seen growing through wall and crevices because turgidity caused by turgor pressure aids the thin-walled tissues of the root tips to crack the walls. (iii) The seeds imbibe water and swell up. The attraction of the dry cell walls and protoplasm for water causes an imbibitional pressure to develop within the plant body. It is this imbibition pressure that causes the can to burst open. (iv) It is due to the loss of turgor pressure at the base of the leaflets and petioles. (v) The fluid in the aqueous chamber, aqueous humour is regularly supplied by arterial capillaries and reabsorbed by venous capillaries of ciliary body. Interference with this absorption increases the intraocular pressure causing excessive stretching of the eyeballs. Hence, this operation is required.</p>	
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