UNIT : 16 PLANT AND ANIMAL HORMONES

I . Choose the correct answer. (Mark in book)

1. Gibberellins cause
   a) Shortening of genetically tall plants **b) Elongation of dwarf plants**
   c) Promotion of rooting d) Yellowing of young leaves

2. The hormone which has positive effect on apical dominance is
   a) Cytokinin **b) Auxin** c) Gibberellin d) Ethylene

3. Which one of the following hormones is naturally not found in plants:
   a) 2, 4-D b) GA3 c) Gibberellin d) IAA

4. Avena coleoptiles test was conducted by
   a) Darwin b) N. Smit c) Paal **d) F.W. Went**

5. To increase the sugar production in sugarcanes they are sprayed with _____
   a) Auxin b) Cytokinin c) Gibberellins **d) Ethylene**

6. LH is secreted by
   a) Adrenal gland b) Thyroid gland **c) Anterior pituitary** d) Hypothalamus.

7. Identify the exocrine gland
   a) Pituitary gland b) Adrenal gland **c) Salivary gland** d) Thyroid gland

8. Which organ acts as both exocrine gland as well as endocrine gland
   a) Pancreas b) Kidney c) Liver d) Lungs

9. Which one is referred as “Master Gland”?
   a) Pineal gland **b) Pituitary gland** c) Thyroid gland d) Adrenal gland.

II Fill in the blanks . (Mark in book).

1. **Auxins** causes cell elongation, apical dominance and prevents abscission.
2. **Ethylene** is a gaseous hormone involved in abscission of organs and acceleration of fruit ripening.
3. _**Abscisic acid** causes stomatal closure.
4. Gibberellins induce stem elongation in **rosette** plants.
5. The hormone which has negative effect on apical dominance is **cytokinin.**
6. Calcium metabolism of the body is controlled by **parathromone.**
7. In the islets of Langerhans , beta cells secrete **insulin.**
8. The growth and functions of thyroid gland is controlled by **TSH.**
9. Decreased secretion of thyroid hormones in the children leads to **cretinism.**

III a) Match Column I with Columns II and III. (Mark in book)

Column I	**Column II**	**Column III**
1.Auxin	*Gibberella fujikuroi* **5**	Abscission **3**
2.Ethylene	Coconut milk **4**	Internodal elongation **5**
3.Abscisic acid	Coleoptile tip **1**	Apical dominance **1**
4.Cytokinin	Chloroplast **3**	Ripening **2**
5.Gibberellins	Fruits **2**	Cell division **4**

III b) Match the following hormones with their deficiency states .

Hormones Disorders

a) Thyroxine	- Acromegaly	**d**
b) Insulin	- Tetany	**c**
c) Parathormone	- Simple goitre	**a**
d) Growth hormone	- Diabetes insipidus	**e**
e) ADH	- Diabetes mellitus	**b**

IV State whether True or false, If false write the correct statement . (Mark in book)

1. A plant hormone concerned with stimulation of cell division and promotion of nutrient mobilization is cytokinin. TRUE.
2. Gibberellins cause parthenocarpy in tomato. TRUE.
3. Ethylene **retards** senescence of leaves, flowers and fruits. FALSE-HASTENS.
4. Exopthalmic goiter is due to the over secretion of thyroxine. TRUE.
5. Pituitary gland is divided into **four** lobes. FALSE-2
6. Estrogen is secreted by **corpus luteum** .FALSE-GRAFFIAN FOLLICLE.

V . Assertion and Reasoning . (Mark in book)

Direction: In each of the following questions a statement of assertion (A) is given and a corresponding statement of reason (R) is given just below it. Mark the correct statement as.

a. If both A and R are true and R is correct explanation of A
b. If both A and R are true but R is not the correct explanation of A
c. A is true but R is false
d. Both A and R are false

1. **Assertion:** Application of cytokinin to marketed vegetables can keep them fresh for several days.
Reason: Cytokinins delay senescence of leaves and other organs by mobilisation of nutrients**. b**

2. **Assertion (A):** Pituitary gland is referred as "Master gland".

Reason (R): It controls the functioning of other endocrine glands. **A**

3. **Assertion (A):** Diabetes mellitus increases the blood sugar levels.
Reason (R): Insulin decreases the blood sugar levels.**b**

VI . Answer in a word or sentence . (Mark in book)

1 **Gibberlin** hormone promotes the production of male flowers in Cucurbits.

2. **2,4 D (Dicholoro phenoxy Acetic Acid)** the name of a synthetic auxin.

3. **Gibberlin** hormone induces parthenocarpy in tomatoes.

4. **Polactin** is the hormone responsible for the secretion of milk in female after child birth.

5. **Aldosteron** is the hormones which regulates water and mineral metabolism in man.

6. **Adrenalin** hormone is secreted during emergency situation in man.

7. **Pancreas** is the gland secretes digestive enzymes and hormones.

8. **Adrenal gland is the** endocrine glands associated with kidneys.

VII . Short answer questions. (WRITE IN CLASSWORK)

1. **Synthetic Auxins are** Artificially synthesized auxins that have properties like auxins are called as synthetic auxins. Example: 2, 4 D (2,4 Dichlorophenoxy Acetic Acid).PAGE :230

2. Treatment of rosette plants with gibberellin induces sudden shoot elongation followed by flowering. This is called **bolting**.PAGE:231

3.

- ABA promotes the process of **abscission** (separation of leaves, flowers and fruits from the branch).
- During water stress and drought conditions ABA **causes stomatal closure**.
- ABA **promotes senescence** in leaves by causing loss of chlorophyll.

- ABA **induces bud dormancy** towards the approach of winter in trees like birch.
- ABA is a powerful **inhibitor of lateral bud growth** in tomato.PAGE:232

4.Spraying auxins can prevent leaf fall and fruit drop in plants. Because auxins prevent the formation of abscission layer which is formed before
separation of plant parts.

5. The hormone produced by the endocrine glands are called chemical messenger. Their secretions are called **hormones** which are produced in **minute quantities**. Th e secretions diff use into the blood stream and are carried to the distant parts of the body. They act on specific organs which are referred as **target organs**. PAGE:233

6.

Endocrine glands	**Exocrine glands**
They are called as ductless glands.	They have ducts to carry their Secretions.
Their secretions are carried by the blood stream	
They produce hormones.	They produce enzymes.
Eg, Thyroid glands	Eg, Salivary gland

7. The parathormone regulates calcium and phosphorus metabolism in the body.They act on bone, kidney and intestine to maintain blood calcium levels.
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8.
The hormones secreted by the posterior pituitary are
a. Vasopressin or Antidiuretic hormone
b. Oxytocin

a. Vasopressin or Antidiuretic hormone (ADH)
In kidney tubules it increases reabsorption of water. It reduces loss of water through urine and hence the name antidiuretic hormone.

b. Oxytocin

It helps in the contraction of the smooth muscles of uterus at the time of child birth and milk ejection from the mammary gland after child birth.PAGE:234

9. Thyroid hormones are essential for normal physical, mental and personality development .so it is also known as **personality hormone**.PAGE:235

10. The hormone thyroxin secreted by the thyroid gland requires iodine for its
formation.
If the intake of iodine in our diet is low the thyroid gland will not able to secrete sufficient quantity of thyroxine. This is called thyroid dysfunction which leads to hypothyroidism.
The following diseases are caused due to hypothyroidism,
Simple Goitre,
Cretinism,
Myxoedema.

VIII. Long answer questions. (Mark in book)

1.a) Ethylene is the gaseous plant hormone..

- Ethylene promotes the **ripening of fruits**. e.g. Tomato, Apple, Mango, Banana, etc.

- Ethylene **inhibits** the **elongation** of stem and root in dicots.
- Ethylene hastens the **senescence** of leaves and flowers.

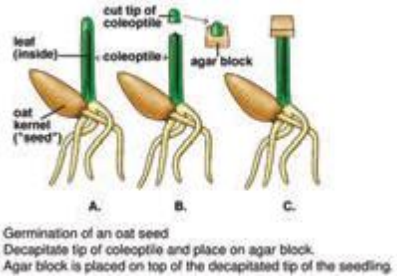
b**) Abscisic acid hormone** is known as stress hormone in plants .

Abscisic acid (ABA) is a **growth inhibitor** which **regulates abscission** and
dormancy. It increases tolerance of plants to various kinds of stress. So, it is
also called as **stress hormone**. It is found in the chloroplast of plants.

2. Frits Warmolt Went (1903– 1990), a Dutch biologist demonstrated the existence and effect of auxin in plants. He did a series of experiments in Avena coleoptiles.

In his first experiment he removed the tips of Avena coleoptiles. The cut tips did not grow indicating that the tips produced something essential for growth.In his second experiment he placed the agar blocks on the decapitated coleoptile tips. The coleoptile tips did not show any response. In his next experiment he placed the detached coleoptile tips on agar blocks. After an hour, he discarded the tips and placed this agar block on the decapitated coleoptile. It grew straight up indicating that some chemical had diffused from the cut coleoptile tips into the agar block which stimulated the growth.

From his experiments Went concluded that a chemical diffusing from the tip of coleoptiles was responsible for growth, and he named it as "**Auxin**" meaning '**to grow**".



A. Germination of an oat seed
B. Decapitate tip of coleoptile and place on agar block.
C. Agar block is placed on top of the decapitated tip of the seedling.

3. Physiological effects of gibberellins

Application of gibberellins on plants stimulate extraordinary **elongation of internode**. e.g. Corn and Pea

Treatment of rosette plants with gibberellin induces sudden shoot elongation followed by flowering. This is called **bolting**

Gibberellins promote the **production of male flowers** in monoecious plants (Cucurbits).

Gibberellins **break dormancy** of potato tubers.

Gibberellins are efficient than auxins in inducing the formation of seedless fruit - **Parthenocarpic fruits** (Development of fruits without fertilization) e.g. Tomato.

4.

Estrogens is produced by the **Graafian follicles** of the ovary.

Functions of estrogens

It brings about the changes that occur during puberty.
It initiates the process of oogenesis.
It stimulates the maturation of ovarian follicles in the ovary.
It promotes the development of secondary sexual characters (breast development, high pitched voice etc).

5. The hormones secreted by the posterior pituitary are

a. Vasopressin or Antidiuretic hormone .

Deficiency of ADH reduces reabsorption of water and causes an increase in urine output (polyuria). This deficiency disorder is called **Diabetes insipidus**.

Hormone secreted by Beta cells of Islets of Langerhans is insulin

The deficiency of insulin causes **Diabetes mellitus**. It is characterised by

Increase in blood sugar level (Hyperglycemia).
Excretion of excess glucose in the urine (Glycosuria).
Frequent urination (Polyuria).
Increased thirst (Polydipsia).
Increase in appetite (Polyphagia).