

#### SYNOPSIS

#### Systematic position

Kingdom	:	Plant Kingdom
Sub - kingdom	:	Phanerogamae
Division	:	Spermatophyta
Sub - division	:	Gymnospermae
Class	:	Cycadopsida
Order	:	Cycadales
Family	:	Cycadaceae
		-

#### **Distribution & Habitat**

- Species of *Cycas* found in dry deciduous forests of Southern India *Cycas* circinalis (Crozier Cycas)
- Species of *Cycas* found in the Eastern ghats of India *C. beddomi* (Madras *Cycas*).
- Species of *Cycas* found in Eastern India *C. pectinata* (Nepal *Cycas*).
- Species of *Cycas* found in Andaman and Nicobar islands *C. rumphii* (Rumphious *Cycas*).
- A Japanese species of *Cycas* that is widely grown as an ornamental plant in India is *C. revoluta*. (Sago *Cycas*)
- A species of *Cycas* growing wild on Tirumala hills *C.beddomi*.

#### Morphology of the sporophyte

- The dominant phase in *Cycas* is **sporophyte**.
- *Cycas* plant grows to a height of **2 to 5 metres.**
- Stem of *Cycas* is **caudex type**.

#### Stem

- The stem in the young sporophyte of *Cycas* is **tuberous**, **underground**.
- Surface of the stem of *Cycas* is hard and rough due to the presence of **woody persistent leaf bases**.

#### Leaves

- Leaves in *Cycas* show habitual heterophylly.
- Dimorphic leaves in *Cycas* are scale leaves and foliage leaves.
- Small, rough, dry, triangular leaves thickly covered with brown hairs are called **scale leaves**.
- The brown hairs present on the scale leaves are called **ramenta**.
- Protection of the stem apex, foliage leaves and other organs when they are young is by **scale leaves.**
- Scale leaves are arranged in spiral succession on the stem alternating with **foliage leaves.**
- Green coloured leaves arranged at the apex of stem as crown are **foliage leaves**.
- The no. of foliage leaves in each crown varies from **one to many.**

- Foliage leaves in *Cycas* are commonly **unipinnately compound.**
- Leaf bases in *Cycas* are **rhomboidal leaf bases**.
- Young leaflets of *Cycas* show **circinate vernation**.
- Fern characters present in the leaf of *Cycas* are ramenta and circinate vernation.

#### Roots

- Apogeotropic roots present in *Cycas* are **coralloid roots.**
- Rough texture of coralloid roots is due to the presence of **lenticels**.
- Type of branching in coralloid roots is **dichotomous**.
- Nitrogen fixing roots in *Cycas* are **coralloid roots**.
- Coralloid roots show symbiotic association with **blue green algae.**
- Blue green algae present in the coralloid roots of *Cycas* are *Anabaena cycadacearum*, *Nostoc punctiforme*.
- Function of coralloid roots of *Cycas* nitrogen fixation, gaseous exchange.

#### Anatomy of coralloid root

- The old coralloid root of *Cycas*, in place of epidermis consists of **periderm.**
- The cortex of coralloid root is divisible into **outer cortex, middle cortex, inner cortex.**
- The cells of the outer and inner cortex of the coralloid root are **thin walled**.
- The large, radially elongated cells which are occupied by symbiotic nitrogen fixing blue-green algae forms the **middle cortex.**
- Middle cortex of the coralloid roots is also known as **algal zone**.

#### Anatomy of leaflet

- The leaflet of *Cycas* internally shows five distinct zones **Epidermis**, **hypodermis**, **mesophyll**, **transfusion tissue**, **vascular bundle**
- Hypodermis in the leaflet of *Cycas* is sclerenchymatous.
- Mesophyll in the leaflet of *Cycas* is differentiated into **palisade and spongy parenchyma**
- The special tissue present in the leaflet of *Cycas* instead of lateral veins is **transfuson tissue**
- The function of transfusion tissue is **lateral conduction.**
- Vascular bundle in *Cycas* leaflet is **Conjoint**, **collateral and open**.
- Cambium in the Vascular bundle of *Cycas* leaflet is in the form of **non functional layer**.
- Xylem in the leaf-let of *Cycas* is **Diploxylic and pseudomesarch**.

- The type of stomata in the leaflet of *Cycas* are **hypostomatous and sunken type.**
- The anatomical xerophytic adaptations shown by the leaflet of *Cycas* are thick cuticle; thick Epidermis, sclerenchymatous hypodermis transfusion tissue; sunken stomata poorly developed spongy parenchyma

#### Reproduction

- The Growth in male plant of *Cycas* is **sympodial**.
- The Growth in female plant of *Cycas* is **monopodial**.
- Vegatative reproduction in *Cycas* is by means of **adventitious buds, bulbils.**
- The sporophyte of *Cycas* starts reproduction by seeds after growing vegetatively for about **10 years**.
- The plants of *Cycas* are heterosporous and dioecious.
- The two types of spores in *Cycas* are **microspores**, **megaspores**.
- The plant of *Cycas* bearing microsporophylls **male plant**.
- The plant of *Cycas* bearing megasporophylls **female plant**.
- The microsporophylls in the male plant organises to form **male cone**.
- Cones are not seen in **female plant**.
- The integumented megasporangia borne on the megasporophylls are **ovules**.

#### Male cone

- Growth of the stem in the male plant of *Cycas* is sympodial because the apical bud is consumed to form **male cone**.
- The arrangement of microsporophylls on the male cone is **acropetal.**
- Some of the microsporophylls present at the base and the top of the cone may be **sterile**.

#### Microsporophyll

- Shape of the microsporophyll is **triangular**.
- The basal part of the microsporophyll is narrow and sterile.
- The terminal sterile portion of the microsporophyll is called **apophysis**.
- The broader fertile part of the microsporophyll lies between **basal part and apophysis.**
- Microsporangia are borne on the fertile part of the microsporophyll on the **abaxial surface (lower)**
- The cluster of 2-6 microsporangia constitute a sorus.
- Unicellular or bicelled structures present intermingled with the sporangia are called **indusial hairs**.
- Presence of indusial hairs in *Cycas* is **fern character**.

#### Microsporangia

- Sporangial development in *Cycas* is **eusporangiate**.
- The outermost layer of the microsporangial wall is called **exothecium.**
- The innermost layer of the microsporangial wall is called **tapetum**.
- The wall of the mature sporangium consists of only the cells of **exothecium**.

#### Megasporophyll

- The arrangement of megasporophylls on the female plant is **acropetal manner**.
- The growth of the stem in female plant in *Cycas* is **monopodial.**
- The no. of ovules borne laterally on the megasporophyll are **1 to 6 pairs.**

#### Ovules

- The ovule of *Cycas* is largest in the **plant kingdom**.
- Ovules in *Cycas* are **orthotropous and unitegmic.**
- The integument in the ovule of *Cycas* is distinguished into **three layers.**
- The fleshy outer and inner layers of the integument in the ovule of *Cycas* is called **sarcotesta**.
- The middle stony layer of the integument in the ovule of *Cycas* is called **sclerotesta**.
- A beak like structure formed in the micropyle due to protrusion of the nucellus is known as **Nucellar beak.**
- A cavity formed due to the breakage of some of the cells in the nucellar beak is known as **pollen chamber**.
- Meiosis in *Cycas* occurs in **spore mother cells.**
- The cell in the nucellus that transforms into megaspore mother cell is **archesporial cell**.

#### Gametophytes

- The result of the sporogenesis in *Cycas* is the formation of **gametophytes.**
- Reproduction in gametophytes of *Cycas* is **sexual** reproduction.

#### Male gametophyte

- The largest pollen grains in plant kingdom are *Cycas* **pollen grains**
- Germination of the microspore results in the formation of **male gametophyte**.
- The cells present in the microspore of *Cycas* after the division are **small prothallial cell and large antheridial cell.**
- The cells formed due to the division of antheridial cell are **tube cell and generative cell**.
- Microspores in *Cycas* are liberated from the microsporangium at **three celled stage.**

#### Female gametophyte

- Free nuclear divisions in the functional megaspore results in the formation of **female gametophyte**.
- Female gametophyte in *Cycas* is **endosperm**.
- Endosperm in *Cycas* formed before fertilization is haploid and is a **female gametophytic tissue**.
- The space formed between nucellus and the endosperm is known as **archegonial chamber**.

#### Archegonium

- The no. of archegonia in *Cycas* are **2-8**.
- Neck canal cells in *Cycas* are **absent**.
- Neck in the archegonium of *Cycas* is **two celled**.
- Venter in *Cycas* is **absent**.
- Egg of *Cycas* is largest in the **plant kingdom**. **Pollination**
- Pollination in *Cycas* is direct and anemophilous.
- The fluid formed due to the disorganization of cells of the nucellar beak is known as **pollination drop**.

#### Development of male gametophyte after pollination

- The cells formed due to the division of generative cell are **Stalk cell and body cell**
- Pollen tube in *Cycas* is formed due the elongation of **tube cell**.
- The no. of antherozoids in *Cycas* formed from each body cell are **two**.
- Antherozoids in *Cycas* are equivalent to **male** gametes.
- Male gametes in *Cycas* are **Naked**, top shaped, motile, multiciliated.
- The manner of arrangement of cilia on the male gametes in *Cycas* is **spiral**.
- Largest male gametes in the plant kingdom are seen in *Cycas*.
- The pollen tube in *Cycas* acts as sperm carrier and also as **haustorium**.
- Presence of multiciliate motile antherozoids in *Cycas* is a **Fern character (primitive nature)**.
- Male gametes present at the tip of the pollen tube are discharged into this part of the ovule of *Cycas* archegonial chamber.

#### Fertilization

- Fertilization in *Cycas* is **siphonogamy and zooidogamy.**
- The process of the transfer of male gametes nearer to the egg cell by the pollen tube is known as **siphonogamy.**
- The process of male gametes in the archegonial chamber reaching the archegonia by swimming (movement) is known as **zooidogamy.**

#### Embryo

• Zygote by free nuclear division and cellularisation forms **proembryo** 

- The proembryo consists of three parts.
  - 1) The upper elongated region of the proembryo is **haustorial region.**
  - 2) The middle elongted region is suspensor region.
  - 3) The lower region of the proembryo is **embryonal** region.
- The embryonal region (part) develops into embryo proper and is differentiated into **3 parts.**
- The three parts of the embryonal region are **two cotyledons**, **plumule**, **radicle**.
- The hard pad like protective structure covering the radicle is known as **Coleorhiza**.
- The no. of embryos formed in *Cycas* are many hence it exhibits **Polyembryony.**
- The no. of embryos that reaches to maturity to form seed is **one**.

#### Seed

- Seeds in *Cycas* are **naked**.
- The no. of generations present in the seed of *Cycas* is **3**.
  - 1) The parent sporophytic generation present in the seed of *Cycas* is **seed coat and nucellus** (perisperm) (2n).
  - 2) The gametophytic generation present in the seed of *Cycas* is **endosperm (n).**
  - 3) The new sporophytic generation present in the seed of *Cycas* is **embryo (2n)**.

#### Seed germination

- Seed germination in *Cycas* is **hypogeal**.
- Dispersal of seeds in *Cycas* may by birds **Ornithochorous.**
- The first crown of leaves in *Cycas* arises after **few years**.

#### Life cycle

- Alternation of generation in *Cycas* are heteromorphic alternation of generations.
- The type of life cycle in *Cycas* is **diplo-haplontic** Systematic position, Distribution & Habitat

#### LEVEL - I

562. Total number of species of *Cycas* growing all over the world.

1.15 2.20 3.4 4.5

- 563. Number of species of *Cycas* found in India 1.20 2.4 3.2 4.1
- 564. Common cultivated species of Cycas is popular as
  - 1. Nepal *Cycas* 2. Madras *Cycas*
  - 3. Sago *Cycas* 4. Crozier *Cycas*

565. The species of Cycas	growing in Andaman and	576. Apical meristem of <i>Cycas</i> stem is protected by
Nicobar islands is		1) Foliage leaves 2) Scale leaves
1. C. revoluta	2. C. beddomi	3) Male cone 4) Megasporophylls
3. C. rumphii	4. C. pectinata	1) Persistent bracts 2) Persistent bracteoles
566. Cycas species are distr	ibuted in	3) Persistent pedicels 4) Persistent leaf bases
1. Northern hemisphere	e 2. Eastern hemisphere	
3. Southern hemisphere	e 4. Western hemisphere	
567. Species of Cycas which	is not found as wild species	5/8. Assertion(A): The habit of <i>Cycas</i> is said to be caudex.
in India is		unbranched with a crown of leaves at its apex
1. C. revoluta	2. C. rumphii	unstanched whit a crown of feaves at its apox
3. C. circinalis	4. C. beddomi	LEAVES
568. Cycas species which is f	ound wild in Tirumala Hills is	LEVEL - I
1. C. rumphii	2. C. revoluta	579. The lanceolate structures present on the rachis of
3. C. circinalis	4. C. beddomi	Cycas leaf are
569. Which species of Cycas	grows wild in Southern India	1. The spines 2. The Ramenta
1. Cycas revoluta	2. Cycas circinalis	3. The Rhomboidal bases of pinnules 4. The leaflets
3. Cycas rumphii	4. Cycas beddomi	580. Number of lateral veins present in each pinnule of <i>Cycas</i>
570. One of the following sp	ecies of Cycas is called "Sago	1.1 2. many 3.6-9 4.0
Cycas"		581. The arrangement of foliage leaves on the stem of <i>Cycas</i> .
1. C. circinalis	2. C. beddomi	1. Opposite 2. Spiral
3. C. revoluta	4. C. rumphii	3. Whorled4. No particular pattern
LEVEL - II		582. The leaves of <i>Cycas</i> are
571. Study the following	and identify the correct	1. Unipinnately compound with parallel venation
combination	·	2. Unipinnately compound with unicostate
A) Cycas beddomi	I) Crozier Cycas	reticulate venation
B) Cycas circinalis	II) Madras Cycas	3. Unipinnately compound with multicostate
C) Cycas pectinata	III) Sago Cycas	reticulate ventation
D) Cycas revoluta	IV) Rumphious Cycas	4. Unipinnately compound with mid vein
, ,	V) Nepal Cycas	583. Inverted 'Omega' ( $\Omega$ ) shaped arrangement of
ABCD	ABCD	vascular bundles is found in
	2 V III IV II	1. Cycas leaf 2. Cycas rachis (of leaf)
		3. Cycas stem 4. Cycas root
Mambalagy of the snowe	T. IV V I II	584. Type of heterophylly seen in <i>Cycas</i> is
worphology of the spore	pnyte, stem	1) Environmental heterophylly
	· ·	2) Habitual heterophylly
5/2. Type of adult stem in C	ycas is	3) Developmental heterophylly
1. Denquescent 3. Caudex	4. Herbaceous	4) Heterophylly is absent
573 $Cycas$ plants grow a he	ight of	585. The shape of leaf base in <i>Cycas</i> is
1. 1 to 3 metres	2.2 to 5 metres	1) Rhomboidal 2) Circular
3. 2 to 3 metres	4. 5 to 10 metres	3) Lanceolate 4) Polygonal
574. The young stem in the sporophyte of <i>Cycas</i> is		586. In <i>Cycas</i> , the lower leaflets of rachis are modified into
1. Tuberous, aerial	2. Tuberous, underground	1) Prickles 2) Scales 3) Spines 4) Thorns
3. Caudex, underground	14. Caudex, aerial	LEVEL-II
575. What structures form pr	otective shield over the stem	587 Assertion (A) · The young leaflets of Cycas show
of Cycas		circinate vernation.
1) Leaf Bases	2) Ramenta	Reason (R) : The young leaflets of <i>Cycas</i> are coiled
3) Girdle leaf traces	4) Spines	like a watch spring.

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588. Assertion (A): <i>Cycas</i> shows habitual heteroophylly Reason (R) : The leaves in <i>Cycas</i> are dimorphic.	597. Sm cal
They are scale leaves and foliage leaves.	1)
589. The chracteristic features of the <i>Cycas</i> foliage leaf are	598. Sy
1) Foliage leaves in <i>Cycas</i> are commonly -	1
ii) Leaf bases in Cucas are - Rhomboidal leaf bases	3)
ii) Young leaflets of $Cycas$ show -Circinate vertation	LEVE
iv) Leaves in <i>Cycas</i> show - Habitual heterophylly	599. As
1 i jij are correct 2 i ji jij are correct	Re
3. i, ii, iii, iv are correct 4 i, ii correct	aeı
590. Select the wrong statement with respect to foliage	600. As
leaves of Cycas	Re
1. They are imparipinnate compound leaves	
2. Rachis of each leaf bears 50-100 pairs of	601 As
leaflets	Re
3. Some of the lower leaflets of the leaf are	in
modified into spines	602. As
4. The leaf has rhomboidal leaf base	inh
591. In <i>Cycas</i> , crowns of foliage leaves may produced	Re
I. Once in a year only II. Twice in a year	the
1) L H H 2) L H 2) H H 4) L H	603. As
1) 1, 11, 111 2) 1, 11 3) 11, 111 4) 1, 111 502 Match the following with respect to Cycas	
<b>J</b> ist <b>I J</b> ist <b>I</b>	
A Rhomboidal I Leaflet	004. <i>NO</i>
B. Inverted omega II. Scale leaf	1.
C. Triangular III. Shape of leaf	2
D. Lanceolate IV. Leaf base	2.
V. Arrangement of vascular	3
bundles in Cycas rachis	4
A B C D A B C D	
1) I V II III 2) II V III I	605. Ch
3) IV V III I 4) IV V II I	con
593. Identify the plant shows dimorphism in all its	i)
1) Europeira 2) Provise 2) Change 4) Delichog lablah	,
1) Funaria 2) Fieris 3) Cycas 4) Dolichos labiad	ii)
ROOTS	
LEVEL - I	iii)
594. The growth of the coralloid roots of <i>Cycas</i> is	:)
1. Orthogeotropic 2. Apogeotropic	1V)
3. Positively geotropic 4. Ageotropic	1.
595. Roots in <i>Cycas</i> are	606 Cc
1) Tuberculated and tap root	i 000.00
2) Fasciculated and coralloid roots	
3) Normal roots and coralloid roots	ii.
4) Adventitious and tap root	
596. The process mainly affected when all the coralloid	iii.
roots of <i>Cycas</i> are removed from the plant	1)

1) Photosynthesis 2) Aerobic respiration

3) Nitrogen fixation 4) No process is affected

nall openings found on coralloid roots of Cycas are lled Stomata 2) Hydathodes 3) Lenticels 4) Nectaries mbiosis takes place in Normal roots of Cycas 2) Leaflet of Cycas *Coralloid* roots of *Cycas* 4) Leaflet of Pteris

#### L-II

- ssertion (A): Cycas exhibits coralloid roots eason (R): Some adventitious roots of *Cycas* grow rially and look like corals
- ssertion (A): The coralloid roots are symbiotic eason (R): They become inhabited by symbiotic trogen fixing blue green algae like Anabaena cadacearum and Nostoc punctiforme.
- ssertion (A): The roots are dimorphic in Cycas. eason (R): Normal and coralloid roots are present Cycas
- ssertion(A): Nitrogen fixation in *Cycas* plant is nibited, if the coralloid roots are removed. eason (R) : Nitrogen fixing bacteria are present in e coralloid roots
- ssertion (A): In Cycas adventitious roots arise from e base of stem at later stages.

eason (R) : Tap root is ephemeral in *Cycas* 

- ostoc punctiforme is
  - An alga belonging to chlorophyceae living in the coralloid roots of Cycas
  - A blue green alga living in the normal adventitious roots of Cycas
  - A chlorophycean alga living in the tap root of Cycas
  - A blue green Nitrogen fixing alga living in the coralloid roots of Cycas.
- noose the correct statement about Cycas ralloid root
  - Apogeotropic roots present in Cycas are coralloid roots
  - Rough texture of coralloid roots is due to the presence of - lenticels
  - Type of branching in coralloid roots is dichotomous
  - Nitrogen fixing roots in Cycas are Tap roots
  - i, iii are correct 2. i, ii, iii are correct
  - 4 i, ii correct i, ii, iv are correct
- oralloid roots in Cycas help in
  - Nitrogen fixation as they are inhabited by blue green algae.
  - Their surface show some lenticels which help in gaseous exchange.
  - They contain chloroplasts, so help in photosynthesis
  - 2) ii only correct i only correct
  - 3) i and ii are correct 4) i, ii and iii are correct

	UNIT -T .: CYCAS		
607. Seclect the <b>incorrect</b> statement with respect to	617. This part of Cycas leaflet serves as heat screen		
Cycas coralloid roots	and protects the plant from over heating and		
1. They possess lenticels	excessive transpiration.		
2. They are apogeotropic	1) Epidermis 2) Hypodermis		
3. They show dichotomous branching	3) Palisade and spongy tissue		
4. They possess nitrogen fixing green algae	4) Transfusion tissue		
ANATOMY OF CORALLOID ROOT	618. Bundle sheath of vascular bundle of <i>Cycas</i> leaflet is		
LEVEL - I	made up of		
608. The coralloid roots of <i>Cycas</i> have an algal zone	2. Soloronohyma 2. Collenchyma		
and the blue green alga present in this zone is	5. Sciencifyina 4. Chlorenenyina 619. In the Cycas leaflet		
1. Ulothrix 2. Bacteria	1 Sunken stomata present in upper epidermis only		
3. Spirogyra 4. Nostoc	2. Sunken stomata present in lower epidermis only		
609 Algal zone is characteristic of	3. Sunken stomata present in lower and upper epidermis		
1 Normal roots of Cycas	4. Stomata are absent		
2 Root hairs of Cycas	620. A functional substitute tissue for lateral veins found		
2. Root hans of Cycus 2. Stom of Cycus	in <i>Cycas</i> leaflets is		
(10 Deviewale in the stale of correllaid most is	1) Transfusion tissue 2) Additional palisade layers		
1 Sinch have a 2 True to three have a	3) Centripetal xylem 4) Centrifugal xylem		
1. Single layered 2. Two to three layered	621. Transfusion tissue in the pinnules of Cycas		
3. Four layered 4. Two layered	represents		
611. In a coralloid root of <i>Cycas</i> , cells are disorganised in	1) Vestigeal internal lateral veins		
1) Outer cortex 2) Middle cortex	2) The tissue that surrounds the midrib region		
3) Inner cortex 4) Endodermis	3) The tissue that controls transpiration		
612. Nitrogen fixing blue-green algae are seen in the	4) The tissue that acts as heat screen		
following tissue of <i>Cycas</i> coralloid roots	622. Palisade tissue extends into mid-rib in		
1) Outer cortex 2) Middle cortex	1) C.pectinata 2) C. circinalis		
3) Inner cortex 4) Pith	3) C. revoluta 4) C. beddomi		
LEVEL-II	623. In <i>Cycas</i> leaf-let, which cells lie parallel to mid-rib?		
	1) Palisade 2) Primary transfusion tissue		
613 The vascular bundles of coralloid root of <i>Cycas</i> are	3) Epidermis 4) Accessory transfusion tissue		
1. Radial, with exarch and triarch xylem.	624. The direction of water in the leaflets of <i>Cycas</i> from		
2. Conjoint, collateral and open	midrib is		
3. Conjoint, closed with endarch xylem.	1) Lateral     2) Downward       2) Unward     4) Downward and unward		
4. Radial, with exarch and polyarch xylem.			
614. Tanins, mucilage ducts, druses are found in	LEVEL-II		
1. Outer cortex of coralloid roots only	625. Assertion (A): Transfusion tissue compensates the		
2. Inner cortex of coralloid roots only	absence of lateral veins in the leaflet of <i>Cycas</i>		
3. Outer and inner cortex of coralloid roots only	Reason (R) : The vascular bundle in the leaflet is		
4. Middle cortex of coralloid roots	conjoint colleteral, open and diploxylic		
	626. Assertion (A): Mesophyll of leaflet in <i>Cycas</i> is poorly		
ANAIUMIY OF LEAFLE I	aerated		
	Reason(R): Secondary transfusion tissue		
615. Leaves in <i>Cycas</i> show	separated the palisade and spongy tissues in the leaflet		

separated the palisade and spongy tissues in the leaflet of *Cycas* 

627. Arrange the following tissues in vascular bundle of *Cycas* leaflet from adaxial side to abaxial side

A. Centrifugal xylem	B. Centripetal xylem
C. Cambium	D. Phloem
1. C, D, B, A	2. A, B, D, C
3. D, C, A, B	4. B, A, C, D

2. Cycas leaflet

4. Cycas root

1. Hydrophytic characters

2. Xerophytic characters

3. Mesophytic characters

4. Lithophytic characters 616. Transfusion tissue is found in

*Cycas* stem
 *Cycas* petiole

- 628. Choose the **correct** statements about *Cycas* leaflet
  - i) The special tissue present in the leaflet of *Cycas* instead of lateral veins is - transfusion tissue
  - ii) Xylem in the leaflet of *Cycas* is Diploxylic and mesarch
  - iii) The type of stomata in the leaflet of Cycas are epistomatous and sunken type
  - iv) The anatomical xerophytic adaptatations shown by the leaflet of Cycas are - well developed spongy parenchyma
  - 1. i, iii are correct 2. i, ii, iii are correct
  - 4. i only correct 3. i, ii, iv are correct
- 629. Identify the incorrect statement regarding the arrangement of cells in the leaflet of Cycas
  - 1. Palisade cells are perpendicular to epidermis
  - 2. Primary transufion cells are parallel to vascular tissues
  - 3. Secondary transfusion cells are perpendicular to palisade cells
  - 4. Palisade cells are parallel to vascular bundle
- 630. This is an **incorrect** statement to *Cycas* leaflet anatomy
- 1) Hypodermis is always single layered on either side of the midrib below the upper epidermis
  - 2) Hypodermis serves as heat screen
  - 3) Hypodermis is two or more layered in midrib region
  - 4) In the lamina region, hypodermis is one or two layered
- 631. The position of centrifugal xylem patches in Cycas leaflets is
  - 1) Towards adaxial surface of centripetal xylem
  - 2) On either side of protoxylem towards phloem of vascular bundle
  - 3) Towards lower side of phloem
- 4) Near to bundle sheath towards upper epidermis
- 632. In the leaflet of Cycas the vascular bundle has
  - 1) More of the centrifugal xylem
  - 2) More of the centripetal xylem
  - 3) Equal amount of centripetal and centrifugal xylem 4) It is variable
- 633. Which of the following is not a xerophytic adaptation in Cycas leaf-let?
  - 1) Differentiation of a mesophyll into palisade and spongy
  - 2) Sunken stomata
  - 3) Thick walled epidermal cells
  - 4) Presence of assimilatory tissue
- 634. The vascular bundle of the Cycas leaf-let is described as diploxylic because it has
  - 1) Phloem and Xylem
  - 2) Primary and Secondary xylem
  - 3) Centripetal and Centrifugal xylem
  - 4) Tracheids and Sieve cells

- 635. Which of the following is **not** a xerophytic feature of the leaflets of Cycas? 1) Presence of centrifugal xylem 2) Sclerenchymatous hypodermis 3) Presence of transfusion tissue 4) Poorly developed spongy tissue 636. Which of the following is **not** a xerophytic adaptation found in the leaflet of Cycas? 1) Presence of druses 2) Sunken stomata 3) Transfusion tissue 4) Scanty spongy tissue 637. Xerophytic adaptations found in Cycas leaflet are 1) Thick cuticle 2) Sunken stomata 3) Sclerenchymatous hypodermis 4) Thick cuticle, sunken stomata and sclerenchymatous hypodermis 638. Read the following lists (EAMCET - 2008) List - I List - II
  - A) Exarch I. Rhizome of Pteris B) Endarch II. Roots of Pteris C) Mesarch III. Pinnule of Cycas D) Pseudomesarch IV. Primary stem of Cycas The correct match is А B C D Α B C D III IV II 2) II IV III I 1) Ι 4) III II I 3) Π IV I III IV
    - REPRODUCTION
- LEVEL I
- 639. Cycas is
  - 1. Monoecious 2. Dioecious 3. Autoecious 4. Polygamous
- 640. Vegetative reproduction in Cycas occurs by means of 1.Bulbils or adventitious buds 2. Suckers 4. Offsets 3. Stolons
- 641. A sporophyte of *Cycas* starts reproducing by seeds after an exclusive vegetative growth of

1) 5 years 2) 1 year 3) 20 years 4) 10 years LEVEL - II

- 642. Assertion (A): Growth of Cycas female plant is sympodial after formation of megasporophylls Reason (R): Terminal bud is not involved in the formation of megasporophylls
- 643. Assertion (A) : Cycas male plant shows sympodial growth after the formation of male cone Reason(R): Terminal bud participates in the formation of male cone and further growth is continued by lateral bud.
- 644. Pick out the incorrect statement regarding a palm like tree with naked seeds studied by you
  - 1) Produces two types of spores
  - 2) Bears alternate whorls of scale and foliage leaves in close succession
  - 3) Bears two types of sporophylls at the tip of the same stem 4) Lives for several years

- 645. What is true for Cycas plant
  - 1) Male strobilus and megasporophylls occur on the same individual
  - 2) Phyllode
  - 3) The same sporophyll bears microsporangia and ovules
  - 4) Male strobilus (cone) and megasporophylls occur on separate individuals
- 646. Cycas is
  - 1) Homosporous and Homophyllous
  - 2) Heterosporous and Heterophyllous
  - 3) Homosporous and Heterophyllous
  - 4) Heterosporous and Homophyllous
- 647. Assertion (A): Growth in the female plant is monopodial Reason (R) : Apical meristem of the stem is not affected in the female plant

#### **MALE CONE**

#### LEVEL-I

- 648. Shape of male cone of Cycas is
  - 1. Oval or globular 2. Oval or cylindrical
  - 3. Oval or fusiform 4. Napiform or fusiform
- 649. Microsporophyll of Cycas is equal to
  - 1. Carpel 2. Stamen
  - 4. Female flower 3. Male flower
- 650. In Cycas the male cone lacks
  - 1) Microspores 2) Nucellus
  - 3) Microsporangium 4) Microsporophyll
- 651. In Cycas, structure which is comparable to thalamus is 1) Microsporophyll 2) Apophysis
  - 3) Sterile basal part of stamen 4) Axis of the cone

#### LEVEL-II

652. Microsporophylls of Cycas

- I) Develop spirally II) Develop basipetally
- III) Bear sori adaxially IV) Equivalent to male flowers
- 1) I & II are correct 2) II & III are correct
- 3) III & IV are correct 4) I alone is correct

#### MICROSPOROPHYLL

#### LEVEL-I

- 653. Terminal sterile portion of microsporophyll of Cycas is called
  - 1. Paraphysis 2. Apophysis
  - 3. Calyptra 4. Stomium
- 654. Shape of Cycas microsporophyll is
  - 1. Tringular 2. Fusiform 3. Conical 4. Oval
- 655. Number of microsporangia in each sorus of Cycas is

1.2-6 2.2-8 3. 2-12 4.700-1000

- 656. Number of cells present in the indusial hairs that occur intermixed with the microsporangia of Cycas is 1.2-3 4.4-5
  - 2.1-2 3.3-4

### LEVEL-II

- 657. Choose the **correct** statement (EAMCET 2005)
  - 1. Apophysis is the bassal fertile part of the capsule in Funaria
  - 2. Apophysis is the apical sterile part of the microsprophyll in Cycas
  - 3. Apospory is the development of sporophyte from vegetative cells of the gametophyte
  - 4. Apogamy is the development of gametophyte from the vegetative cells of the sporophyte
- 658. Which of the following is a feature of Cycas
  - 1) Occurrence of microsporangia on the abaxial side of stamen
  - 2) Occurrence of mega-and micro sporangia on leaves
  - 3) The complete elimination of archegonia
  - 4) Occurrence of the phenomenon of polyembryony

	i) occurrence of the price	nomenon or polyemory ony						
MICROSPORANGIA								
LEV	EL-I							
659.	9. Radial and inner tangential walls of this layer of							
	Cycas microsporangium are thickened							
	1. Exothecium 2. Tapetum							
	3. Microspore mother cells 4. Middle wall layers							
660.	Microsporangia of Cyca	s are intermingled with						
	I) Paraphyses II) Indust	al hairs III) Trabeculae						
	1) I & II 2) II only	3) I & III 4) I, II & III						
661.	The outermost layer of mic	crosporangial wall in Cycas is						
	1) Exothecium	2) Endothecium						
	3) Tapetum	4) Middle layers						
662.	The innermost layer of mic	crosporangial wall in <i>Cycas</i> is						
	1) Epidermis	2) Middle layers						
	3) Endothecium	4) Tapetum						
663.	B. During the liberation of microspores in Cycas							
	microsporangial wall contains							
	1) Endothecium only							
	2) Exothecium and Endothecium							
	3) Exothecium only 4	) Exothecium and tapetum						
LEV	EL-II							
667	The lovers which provide	nutrition to the developing						
.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	nollen grains in microsn	orangium of <i>Cycas</i> are						
	I Exothecium II Tanet	hum III Inner wall lavers						
	1. I. II. III 2. II only	3. II. III 4. III only						
665.	Arrange the following lave	rs found in microsporangium						
	of <i>Cycas</i> from outside to	o inside						
	A. Tapetum	B. Microspore mother cells						
	C. Middle wall layers	D. Exothecium						
	1. D, C, A, B	2. B, A, C, D						

4. B, C, A, D

3. A, C, B, D

666. Assertion (A) : In <i>Cycas</i> sporangial development is	LEVE
eusporangiate type.	LEVE
Reason (R): In <i>Cycas</i> , sporangial development takes place from a group of initials.	675. <i>C</i> j 1.
667. Number of spores formed from a <i>Cycas</i> micro- sporophyll with 500 microsporangia each of which contains 200 microspore mother cells	2. 3. 4.
1) 10,000 2) 1,00,000 3) 4,00,000 4) 8,00,000	676. W
MECASPOROPHVLL	di
LEVEL - I	1)
668 A rrangement of megas noronhylls on female plant of	(77)
<i>Cvcas</i> is	677. W
1. Cubical in acropetal manner	1)
<ol> <li>Spiral in basinetal manner</li> </ol>	3)
3. Spiral in acropetal manner	678. A
4. Cubical in basingtal manner	1)
4. Cubical in basipetal mainter	3)
(megasporophyll) of Cycas is	679.N
$1 1_{-6} = 2 1_{-6} \text{ pairs} = 3 2_{-8} = 4 2_{-8} \text{ pairs}$	1) 680 M
670 On the megasporonhyll of <i>Cycas</i> oyules are	1
developed at	IEVE
1. Dorsal side 2. Ventral side	
3. Laterally 4. Both dorsal and ventral sides	681. A
671. Arrangement of microsporophylls and megasporophylls in <i>Cycas</i> is	Re de
1) Opposite ducussate 2) Opposite superposed	682. A
3) Whorled 4) Spiral	pe
672. In Megasporophyll of <i>Cycas</i> , the ovules are found here	A
1) Upper part2) Middle part	C.
3) Lower part4) All over sporophyll	1.
LEVEL - II	3.
673. In Cycas, the presence of ramenta is seen in	683. A
I) Foliage leaves II) Scale leaves	ac
III) Megasporophylls	I.
1) I and II 2) I and III 3) II alone 4) II and III	III
674. Study the following table :	1.
List-I List-II	684. A
A) Growth of male plant I) Monopodial growth B) Growth of female plant II) Sympodial growth	to 1)
C) Hairs present on III) Indusial hairs	2)
microsporophyll	3)
D) Hairs present on IV) Ramenta	4)
Megasporophyll	685. II D
$\begin{array}{cccc} A & B & C & D \\ 1 & H & I & H & IV \end{array} $	1)
3) II III I IV 4) I II III IV	3)
	I É

# 'EL-I

**OVULES** 

675. Cycas ovule is					
1. Orthotropous and un	iitegmic				
2. Orthotropous and bi	tegmic				
3. Anatropous and unit	egmic				
4. Anatropous and bite	emic				
676. Which of the following	is NOT the contribution of				
diploid tissue in Cycas	ovule?				
1) Pollination drop	2) Archegonia				
3) Pollen chamber	4) Archegonial chamber				
677 Which of the following	ng is NOT a gametonhytic				
structure in the life cycl	e of a Cycadaceae member?				
1) Prothallial cell	2) Endosperm				
3) Immature ovule	1) Archegonium				
678 A lover of Cycas ovule	without vosculature is				
1) Nucellus	2) Sclerotesta				
3) Inner sarcotesta	4) Outer spreatests				
670 Number of majorates f	4) Other sarcolesta				
1) Only one $2$ 2	$3) 4 \qquad 4) 2 = 8$				
680 Megasporangium of C	$y_{cas}$ is also known as				
1) Ourla 2) Nucelly	yeas is also known as				
	is 3) Fund 4) wherebyle				
LEVEL - II					
681. Assertion (A) : Pollen of	chamber in <i>Cycas</i> ovule is a				
lysigenous cavity.					
Reason (R): Some of the	e cells of nucellar beak break				
down to form a cavity c	alled the pollen chamber.				
682. Arrange the following st	ructures of Cycas ovule from				
periphery to centre					
A. Nucellus	B. Female gametophyte				
C. Outer sarcotesta	D. Inner sarcotesta				
E. Sclerotesta					
1. C, A, B, D, E	2. C, E, D, A, B				
3. B, A, D, E, C	4. B, A, C, D, E				
according to their positio	on from tin to base in an ovule				
of Cycas	in nom up to base in an ovule				
I Pollen chamber	II Micronyle				
III Endosnerm	IV Archegonial chamber				
684. Archesporial cell of	<i>Cycas</i> nucellus forms the				
following cells					
1) Prothallial cell and megaspore mother cell					
2) Parietal cell and megaspore					
3) Prothallial cell and megaspore					
4) Parietal cell and megaspore mother cell					
685. These layers of integument are vascularised in Cycas					
I) Outer layer II) Mid	dle layer III) Inner layer				
1) I, II & III are correct 2) I & II are correct					
3) I & III are correct	4) II & III are correct				
_					

686. Study the following lists: List - I L (Plant Part) (1	(EAMCET - 2005) .ist - II Number of Sets f Chromosomes)	<ul> <li>692. In <i>Cycas</i>, microspores liberate at</li> <li>1. Single celled stage</li> <li>2. Two celled stage</li> <li>3. Three celled stage</li> <li>4. Five celled stage</li> </ul>
<ul> <li>A) Sarcotesta of <i>Cycas</i></li> <li>B) Aposporous gametophores of <i>Funaria</i></li> <li>C) Azygospore of Rhizopus</li> <li>D) Hypostomium of <i>Pteris</i></li> <li>Correct match is</li> <li>A B C D</li> <li>1) V III IV II</li> <li>2) I IV II V</li> <li>3) V I II IVII V</li> <li>3) V I II III</li> <li>4) II IV III I</li> <li>687. Match the following</li> <li>List – I</li> </ul>	Haploid I. Diploid I. Diploid V. Haploid V. Diploid	<ul> <li>by 5. The derivatives of the first mitotic division in <i>Cycas</i> microspore are <ol> <li>Prothallial cell and generative cell</li> <li>Prothallial cell and antheridial cell</li> <li>Generative cell and antheridial cell</li> <li>Tube cell and generative cell</li> </ol> </li> <li>694. Which cell can not be seen before the germination of pollen grain of <i>Cycas</i> in the pollen chamber <ol> <li>Prothallial cell</li> <li>Tube cell</li> </ol> </li> <li>695. The cell which does not divide in male gametophyte of <i>Cycas</i> is <ol> <li>Prothallial cell</li> <li>Generative cell</li> </ol> </li> </ul>
<ul> <li>A) Pollen chamber I) C.</li> <li>B) Transfusion tissue II) C.</li> <li>C) Triarch and exarch III) C.</li> <li>D) Algal zone IV)</li> <li>1. A-I, B-III, C-II, D-IV 2)</li> <li>3. A-IV, B-III, C-II, D-I 4)</li> </ul>	<i>ycas</i> leaflet <i>Cycas</i> coralloid root <i>Cycas</i> coralloid root <i>Cycas</i> ovule A-IV, B-I, C-II, D-III A-IV, B-II, C-III, D-I	3. Antheridial cell4) Body cellLEVEL - II696. Partly developed male gametophyte in Cycas possesses A. Prothallial cellB. Stalk cell D. Antheridial cell
<ul> <li>688. Study the following lists with reference to Cycas</li> <li>List I</li> <li>A. Exothecium</li> <li>B. Indusial hairs</li> <li>C. Sclerotesta</li> <li>D. Parietal cell</li> <li>IV. Radial and tangential walls are</li> </ul>		<ul> <li>E. Tube cell</li> <li>F. Generative cell</li> <li>I. A, E, F</li> <li>A, D, F</li> <li>A, B, F</li> <li>A, C, E, F</li> <li>697. In <i>Cycas</i>, axis of male cone elongates when the</li> <li>1) Microspore mother cells undergo meiosis</li> <li>2) Antheridial cell divides into two cells</li> <li>3) Spermatogenesis is completed</li> <li>4) Generative cell divides into two cells</li> </ul>
V. Found of A B C D 1) IV V I III 3) V IV II III GAMETOPHY	n microsporophyll A B C D 2) V IV I II 4) IV V I II TES	<b>FEMALE GAMETOPHYTE</b> <b>LEVEL - I</b> 698. The space develops on the upper side between nucellus and the female gametophyte due to degeneration of certain nucellar cells in <i>Cycas</i> is 1. Pollen chamber 2. Archgegonial chamber
LEVEL-1689. Microspore and megaspores are1.First cells of male and female gametophytes respectively2.First cells of female and male gametophytes respectively3.Last cells of male and female gametophytes respectively4.Last cells of female and male gametophytes respectively690. Sexual reproduction in Cycas occurs on1. Gametophytes2. Sporophytes3. Both gametophytes and sporophytes4. Sexual reproduction is absent in Cycas		<ul> <li>3. Pollination drop</li> <li>4. Archegonial chamber and pollination drop</li> <li>699. The female gametophyte of <i>Cycas</i> after fertilization is <ol> <li>Haploid 2) Diploid</li> <li>Triploid 4) Polyploid</li> </ol> </li> <li>700. This character is not found in <i>Cycas</i> <ol> <li>Lenticels</li> <li>Siphonogamy &amp; zooidogamy</li> <li>Triploid endosperm</li> <li>Circinate vernation</li> </ol> </li> <li>701. The female prothallus in <i>Cycas</i> is <ol> <li>Independent 2) Rhizoidal 3) Parasitic 4) Diploid</li> </ol> </li> </ul>
MALE GAMETO LEVEL - I	РНҮТЕ	<b>LEVEL-II</b> 702. Assertion (A): The endosperm in <i>Cvcas</i> is

691. The number of prothallial cells in male gametophyte of Cycas is

1.1	2.2	3.3	4.0

48

haploid.

Reason (R): The endosperm in *Cycas* is female gametophytic tissue formed before fertilization.

703. If the haploid number of chromosomes in *Cycas* 12, what will be the number of chromosomes in their roots and endosperm

1.12,12 2.12,24 3.24,12 4.24,36 704 Match the following regarding *Cycas* 

4.	Match	the .	10110	wing	regar	ung	Cyca	S
	List I					T	ist II	ſ

1130	L-T				
A) (	A) Carpel			I) Microsporophyll	
B) S	Stame	n			II) Ovule
C) I	ntegu	mente	d		III) Megasporophyll
Ν	legasp	orang	gium		
D) I	Femal	e gam	etoph	yte	IV) Endosperm
	А	В	С	D	
1)	Ι	Π	III	IV	
2)	III	Ι	IV	Π	
3)	III	Ι	II	IV	
4)	Ι	III	II	IV	

# ARCHEGONIUM

#### LEVEL - I

705.	In plants,	largest egg	is	found in

- 1. Cycas2. Pteris
- 3. Funaria4. Pinus
- 706. Number of archegonia present in each female gametophyte of *Cycas* is
  - 1. 1-6 pairs 2. 2-8 pairs 3. 2-8 4. 1-6
- 707. Number of neck cells present in the archegonium of *Cycas* is

1.1 2.2 3.3 4. Zero

#### LEVEL - II

708. Number of cells and nuclei present in *Cycas* archegonium respectively

 $1.\ 3 \ and \ 4 \quad 2.\ 2 \ and \ 3 \quad 3.\ 1 \ and \ 2 \quad 4.\ 3 \ and \ 3$ 

- 709. Which of the following are absent in *Cycas* archegonium?
  - I. Cover cells II. Neck canal cells III. Egg 1. I, II, III 2) I, III 3) I, II 4) II, III
- 710. When 36 archegonia are formed in 6 ovules of a *Cycas* plant, the minimum number of meiotic divisions that have occurred in megaspore mother cells is

1.6 2.9 3.18 4.36

- 711. Arrange the following with respect to *Cycas* in an ascending order based on their numbers.
  - A. Microsporangia in each sorus
  - B. Ovules on each megasporophyll
  - C. Archegonia in each ovule
  - D. Microsporangia on each microsporophyll

3. B, C, A, D 4. C, A, D, B

12.	12. The number of neck cells in <i>Cycas</i> archegonium is				
	I. Equal to the number of carpels in Datura				
	II. Double to the number of seeds in Caryopsis				
Ι	III. Equal to the haploid number of chromosomes in				
	H	aplop	oappu	s grad	cilis
	1. I, I	I only	7		2. II, III only
	3. I, I	II onl	у		4. I, II, III
/13.	Mate	h the	follov	ving w	with respect to Cycas
	List	– I			List – II
	A. In	dusial	l hairs		I. Microsporophyll
	B. R	ament	ta		II. Magasporophyll
	C. Eg	gg			III. Male gametophyte
D. Prothallial cell			ial cel	1	IV. Archegonium
		Α	B	С	D
	1)	III	Ι	IV	Ш
	2)	Ι	III	Π	IV
	3)	Π	Ι	III	IV
	4)	Ι	Π	IV	III

#### POLLINATION

#### LEVEL - I

714.	Pollination in Cycas is exclusively by			
	1. Wind	2. Insect	3. Water	4. Man
715.	Pollination	in <i>Cycas</i> is		

1. Indirect 2. Direct 3. Direct or indirect 4. Absent

#### LEVEL - II

716. In Cycas nucellar beak	cells break	down and form
A. Pollen chamber	B. Archeg	onial chamber
C. Pollination drop		
1. A, B, C 2. A, B	3. B, C	4. A, C

#### DEVELOPMENT OF MALE GAMETOPHYTE AFTER POLLINATION

#### LEVEL - I

- 717. Number of mitotic divisions occurs in pollen grain of *Cycas* is
  1) 4
  2) 3
  3) 2
  4) 1
- 718. The fully developed male gametophyte of *Cycas* contains
  1) Four cells
  2) Five cells
  3) Five cells
- 3) Eight Cells
  4) Ten cells
  719. In *Cycas*, generative cell divides to form

  Male gametes
  Prothallial cell and stalk cell
  Stalk cell and tube cell
- 720. The development of male gametophyte of *Cycas* takes place after pollination in
  - 1) Archegonia 2) Archegonial chamber
  - 3) Stigma 4) Pollen chamber
- 721. Number of helices of cilia found on spermatozoid of *Cycas* is
  - 1) 3 4 2) 4 5 3) 5 6 4) 2 3

#### LEVEL - II

722.	Assertion (A) : The antherozoids are naked, top
	shaped, motile and multiciliated in Cycas.
	Reason (R): The pollen tube in <i>Cycas</i> besides being
	a sperm carrier, is also haustorial in nature

# 723. Select the **correct** progressive order of the formation of the following cells during the development of male gametophyte in *Cycas*

I. Tube cell	II. Antheridial cell
III. Stalk cell	IV. Antherozoid
1. II, I, III, IV	2. II, III, I, IV
3. III, II, I, IV	4. IV, III, II, I

- 724. The antherozoids in *Cycas* are

  Small, uniciliate and ovoid in shape
  Small, lens shaped and multiciliate
  Large, top shaped and multiciliate
  Large, sickle shaped and biciliate

  725. The correct sequence of cells formed in the development of male gametophyte of *Cycas*B. Male gametes
  C. Antheridial Cell
  - 1. D, C, A, B
     2. C, D, A, B
  - 3. C, D, B, A 4. D, C, A, B
- 726. Starting with unincleate pollen grains in *Cycas*, to produce 200 spermatozoids, then required number of mitotic divisions is
  - 1.400 2.200 3.100 4.50
- 727. The cells which do not divide further in the male gametophyte of *Cycas* areA. Antheridial cellB. Stalk cell
  - C. Tube cell D. Body cell
  - E. Prothallial cell F. Generative cell
  - 1. A, B, C 2. B, C, D 3. B, C, E 4. B, D, E
- 728. The number of mitotic divisions required for the production of sperm mother cell in the male gametophyte of *Cycas* is
  - 1) 2 2) 4 3) 3 4) 1
- 729. Pollen tube in *Cycas* acts as aI. Pollen carrier II. Sperm carrierIII. Haustorium
  - 1) I, II, III 2) I, II 3) I, III 4) II, III
- 730. Study the following lists: (EAMCET 2005)
- List IList IIA) Pteris-SpermatozoidsI. Zooidogamy
- B) *Cycas*-male gametes II. Malic acid
- C) *Funaria*-Antherozoids III. Oogamy
- D) Spirogyra-Aplanogametes IV. Sucrose

V.Physiological
anisogamy

	А	В	С	D	
1)	Ι	V	IV	III	
2)	II	V	IV	Ι	
3)	III	II	IV	V	
4)	II	Ι	IV	V	

- 731. Number of meiotic divisions, mitotic divisions that occur during the formation of eight male gametes from a microspore mother cell in *Cycas* respectively 1.1,7
  2.2,8
  3.1,16
  4.1,10
- 732. The largest parts of *Cycas* in the plant kingdom arei.Ovule ii. Eggiii. Male cone iv. Male gamete
  - 1) i alone is correct 2) i and ii are correct
  - 3) i, ii and iii are correct 4) i, ii,iii and iv are correct

#### FERTILIZATION

#### LEVEL - I

- 733. Zooidogamy is a type of 1. Isogamy 2
  - 2. Anisogamy
  - 3. Oogamy 4. Physiological anisogamy
- 734. In *Cycas*, during fertilization, which part of the male gamete is sucked into the archegonium?
  - 1) Cytoplasm 2) Entire male gamete
  - 3) Membrane 4) Nucleus

#### LEVEL - II

735. Assertion (A): *Cycas* shows both siphonogamy and zooidogamy

Reason (R) : Motile male gametes are carried by pollen tube

736. Assertion (A) : Fertlization in *Cycas* is called zooidogamy

Reason (R) : Fertlization in *Cycas* takes place by formation of pollen tube (EAMCET - 2004)

- 737. Select the correct statement with respect to Cycas
  - 1) Siphonogamy is followed by zooidogamy
  - 2) Zooidogamy is followed by siphonogamy
  - 3) Fertilization is isogamy
  - 4) Fertilization is anisogamy
- 738. The antherozoids are released into this part of *Cycas* ovule at the time of fertilization
  - i) Micropyle
    ii) Archegonial chamber
    iii) Pollen chamber
    1) i alone is correct
    3) ii alone is correct
    4) ii and iii are correct
- 739. Calculate the minimum number of equational divisions meant for the formation of male gametes from pollen grains that are already released from a male *Cycas* plant in order to fertilize 100 *Cycas* ovules, each possessing the maximum possible number of archegonia in it.

1) 800 2) 1600 3) 100 4) 200

- 740. The number of pollen grains required to fertilize the ovules of a *Cycas* megasporophyll with maximum number of ovules and each ovule having maximum number of archegonia
  - 1) 96 2) 24 3) 48 4) 36

- 741. A female Cycas plant bears 10 megasporophylls. Each megasporophyll bears 2 ovules, each with 5 archegonia. How many pollen grains are required to fertilize all archegonia present in that plant? 2) 50 1)603) 100 4) 120 **EMBRYO** LEVEL-I 742. First sporophytic cell is 1. Spore 2. Spore mother cell 3. Zygote 4. Female gamete 743. Hard pad like protective covering of the radicle in Cycas is called 1) Cotyledon 2) Calyptra 3) Coleorhiza 4) Coleoptile 744. Cycas embryo contains 1) One cotyledon 2) Two cotyledons 3) No cotyledons 4) Several cotyledons 753 LEVEL-II 745. Assertion (A): Polyembryony is found in Cycas Reason (R) : Many ovules are produced on each megasporophyll of Cycas 746. In Cycas free nuclear divisions occur during the 754 formation of A. Female gametophyte B. Male gametophyte C. Embryo 1. A, B, C 2. B, C 3. A, B 4. A,C 747. Haustorial nature is found with the following structures of Cycas plant 755 I) Pollen tube II) Embryo III) Nucellus 1) I, II, III 2) I, III 3) II, III 4) I, II 748. Minimum number of reduction divisions required to produce maximum possible number of seeds with 5 embryos each in a megasporophyll of Cycas 1.15 2.21 3.24 4.28 749. Match the following with respect to Cycas List I List II A. Archegonia I. Seed B. Embryos II. Female gametophyte C. Ovules III. Magasporophyll D. Male gametes IV. Pollen tube В С D А А B С D 1) Π III I IV 2) I Π IV III 756 3) Π Ι III IV 4) II Ι IV III SEED LEVEL-I 750. The tissue which separates pollen chamber and archegonial chamber of Cycas ovule is
  - 1) Endosperm 2) Nucellus 3) Female Gametophyte
  - 4) Innermost layer of integument of ovule
- 751. Seeds of Cycas are
  - 1) Endospermic only 2) Perispermic only
  - 3) Endospermic and Perispermic
  - 4) Non-endospermic

### LEVEL - II

752. Select the **correct** matching with regard to *Cycas* post fertilization changes.

pos		Zatioi	TCHan	ges.	
	)   -				151 - 11
Par	ts of (	Ovul	e	Cha	anges occuring after
				fei	rtilization
A. Ovule I.				Seed coat (Testa) (2n)	
B. I	ntegur	nent		II.	Seed pore.
C. 7	Zygote	;		III	. Perisperm (2n)
D.1	Nucell	us		IV	Embryo (2n)
E.N	Aicror	vle		V	Seed
201	Δ	R	C	D	F
1)	T	п	m	D IV	V
$\frac{1}{2}$	I V	н п/	111 111	т П	v T
2) 2)	V	IV		11	l H
3)	V	1	IV	111	
4)	IV	III	II	I	V
. Ass	ertion	(A):	The se	ed of (	<i>Cycas</i> comprises tissues
of tl	nree ge	enerat	tions		
Rea	son (F	R) : Ii	n <i>Cycu</i>	as the	seed comprises parent
spor	rophyt	e (see	ed coa	t and r	nucellus), gametophyte
(end	losper	m) an	d new	sporo	phyte (embryo)
. Poly	/embry	yony i	s com	mon in	n Cycas because
1) I	Embry	o con	tains n	nany co	otyledons
2) 2	2-8 ovi	ules a	re pres	sent on	each megasporophyll
3) 2	2-8 arc	haego	onia ar	e prese	ent in each ovule and all
8	are fert	ilied			
4) (	One er	nbryo	produ	ices ma	any seedlings
. Mat	ch the	follov	wing		
Lis	t I				List II
А.	Leafle	et of O	Cycas		I. Triarch and exarch
					xylem
В.	Corall	oid ro	ot of (	Cycas	II. Diploxylic vascular
					bundles
C.	Seed of	of Cy	cas		III. Triploid
D.	Endos	perm	of Cy	cas	IV. Tissues of three
		-			generations
					V. Haploid
	Α	В	С	D	1
1)	П	I	ĪV	V	
$2)^{-1}$	I	П	IV	V	
$\frac{-}{3}$	П	I	V	ĪV	
$\frac{3}{4}$	П	T	ĪV	Ш	
Mat	ch the	follo	wing v	vith re-	spect of Cycas
Lis	t I	10110	I	ist II	speet of cycus
	r I Embra	10	I	Gamet	tonhytic generation
D.	Dorion	orm	і. П	1 at an	orophytic generation
р. С	B. Perisperm II. 1st sporophytic generation				
C. Endosperm III. 2nd sporophytic generation					
D.		П	1 v. ln	egume	med megasporangium
1)	A	в	U T		
$\frac{1}{2}$	Ш	1	11		
2)	11 	111 T	1	IV	
3)	III	II T	l	IV	
4)	Ш	11	1V	1	

SEED GERMINATION	765. Archegonium of <i>Pteris</i> differs with the archegonium			
LEVEL - I	of <i>Funaria</i> in having			
757. Seed of <i>Cycas</i> are dispersed by	i. Enucleated neck canal cell			
758. Type of seed germination in <i>Cycas</i> is	ii. Dikaryotic neck cell			
1. Epigeal 2. Hypogeal	iii. No cover cells			
3. Vivipary 4. 'Insitu' germination	1) i is correct 2) ii and iii correct			
LEVEL-II	3) iii is correct 4) i and iii correct			
759. A <i>Cycas</i> plant possess 50 bulbils and a crown of 50	766. Pteris differs from Funaria in having			
integumented megasporangia on each Megasporo-	1)An independent gametophyte with well developed conducting system			
from that plant only because of sexual reproduction	2) An independent dominant sporophyte			
1,200 2,300 3,350 4,400	3) Swimming antherozodies			
	4) Single archegonia			
LIFE CYCLE	767. What is the ratio of equational divisions that take			
760. Life cycle in <i>Cycas</i> is	place in <i>Cycas</i> and angiosperms respectively leading to the formation of male gametes from pollen grains?			
1. Haplontic 2. Diplontic	1.3:2 2.3:1 3.2:1 4.2:3			
3. Haplo-diplontic4. Diplo-haplonticLEVEL - II	768. Study the following and identify two characters found in both <i>Cycas</i> and <i>Pteris</i> . (EAMCET - 2007)			
761. Assertion (A): Cycas gametophytes are always	I. Formation of motile male gametes			
dioeicous	II. Formation of haploid endosperm			
Reason (R) : <i>Cycas</i> sporophytes are dioecious and heterosporous	III. Formation of sporophyte directly from gametophyte without gametic union			
762. The following is not the fern character present in <i>Cycas</i>	IV Formation of archegonia in female gametonhyte			
2) Formation of prothallial cell and antheridial cell	The correct pair is			
3) Presence of ramenta	1 Land IV 2 Land III			
4) Young leaves show circinate vernation	3 II and IV A III and IV			
I FVFI - III	769 Diplobaplontic life cycle is seen in			
763. The structure that helps in separation of opercular	I Fungria II Pteris III Cycas			
region from theca in bryophytes and sporangial	1) Lalone 2) II alone 3) III alone 4) II and III			
dehiscence in pteridophytes is	770 Match the following			
1.Stomium 2.Rim 3.Annulus 4.Lip cells	List I List II			
/64. Study the following table:	A. Dictyostele I. Cycas leaflet			
1) Dictyostele – Leptosporangiate – Haploid spore	B. Diploxylic II. <i>Cycas</i> coralloid root			
<ol> <li>Unbranched Rhizoids – Sessile gametangia – Diploid spore</li> </ol>	C. Blue green algae III. Funaria			
iii) Presence of secondary growth – Presence of	D. Hydroids IV. <i>Pteris</i> rhizome			
sporophyll – Embryophyte	V. Rhizopus			
iv) Atracheophyte – Sporophyte is partial parasite - Protonema	The correct match is			
select the correct pair of answers in which the former				
in the pair shows the set of characters of <i>Pteris</i> and	2) II V I III			
later in the pairs shows the set of characters absent in <i>Funaria</i>	3) III IV II V			
1) $i \& iv 2) iii \& ii 3) iii \& i 4) i \& ii$	4) IV I II III			