

Question paper contains

20/12/24
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I

Unique Paper Code : 2162013501

Name of the Paper : Molecular Biology of the Cell

Name of the Course : **B.Sc. Botany NEP (UGCF-2022)**

Semester : V

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all.
3. Question No. **1** is compulsory.
4. **All** parts of a question should be answered together.

1. (a) Define the following (**any five**) : (1×5=5)
- (i) Codon
- (ii) Split gene

P.T.O.

- (iii) Inducer
- (iv) Primosome
- (v) Okazaki fragment
- (vi) Glycosylation

(b) Expand the following (**any five**) : (1×5=5)

- (i) ORF
- (ii) PCNA
- (iii) miRNA
- (iv) TBP
- (v) T_m
- (vi) CRP

(c) Answer the following in one word (**any five**) : (1×5=5)

- (i) Enzyme encoded by the *lacZ* gene.
- (ii) Sequence of 5' and 3' splice site.
- (iii) Enzyme involved in charging tRNA during protein synthesis.
- (iv) Give the percentage of adenine present in a DNA molecule having 30% guanine in its base composition.

(v) RNA polymerase subunit required to initiate transcription in prokaryote.

(vi) Name the enzyme involved in removal of RNA primer during eukaryotic DNA replication process.

2. Differentiate between the following (**any five**) :

(3×5=15)

(a) A- DNA and B- DNA

(b) Topoisomerase-I and Topoisomerase-II

(c) Denaturation and Renaturation of DNA

(d) Negative and Positive Gene Regulation in *Lac* Operon

(e) Monocistronic and Polycistronic RNA

(f) Prokaryotic and Eukaryotic Ribosome

3. Write short notes on (**any three**) :

(5×3=15)

(a) Mechanism of splicing

(b) Attenuation in *Trp* operon

(c) Theta mode of DNA replication

(d) Central Dogma

(e) Transcription termination in eukaryotes

4. (a) With a well labeled diagram, discuss the mechanism of initiation in prokaryotic translation and compare it with that of eukaryote. (8)
- (b) Explain the salient features of genetic code. (5)
- (c) Name two unusual bases present in tRNA. (2)
5. Attempt **any two** of the following : (7.5×2=15)
- (a) With the help of a well labelled diagram, explain the mechanism of RNA interference.
- (b) How did Fraenkel – Conrat proved that RNA is genetic material in some viruses?
- (c) What are consensus sequences? Explain them with reference to prokaryotic and eukaryotic promoter regions.
6. (a) Discuss the mechanism of transcription termination in prokaryotes. (8)
- (b) With a well labelled diagram, discuss end replication in eukaryotes. (7)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1093

I

Unique Paper Code : 2162013502

Name of the Paper : Reproductive Biology of Angiosperms

Name of the Course : **Botany**

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four questions** in all, including Question Number 1 which is compulsory.
3. All parts of a question must be answered together.
4. All questions carry equal marks.
5. Draw well-labelled diagrams and write the botanical names wherever necessary.

1. (a) Give significant contributions of the following (Any two):
(2×2.5=5)

(i) Jensen

(ii) S.G. Nawaschin

(iii) P. Maheshwari

- (b) Name the species/ plant in which the following occurs:
(1×5=5)

(a) Largest seed

(b) Pseudo embryo sac

(c) Smallest angiosperm flower

(d) Cleistogamous flowers

(e) Tristyly

- (c) Fill in the blanks:
(1×5=5)

(i) Pseudomonads are characteristic of family

_____.

(ii) In Litchi, the edible part is _____.

(iii) Ruminate endosperm is found in

_____.

(iv) _____ is responsible for crowding effect in pollen germination.

(v) Reproductive barriers can be overcome by intra-ovarian pollination in members of the family

_____.

2. Differentiate between the following (**Any three**):

5×3=15

(i) Homomorphic and Heteromorphic Incompatibility

(ii) Amoeboid and Secretory tapetum

(iii) Monosporic and Tetrasporic embryo sac development

(iv) Endothecium and endothelium

(v) Ornithophily and Anemophily

3. Attempt **any two** of the following:

(7.5×2=15)

(a) Elaborate upon the significance of reproductive biology in the conservation of plants.

(b) How is a seed designated as a storage organ? Explain with relevant examples.

(c) Short-distance transport occurs in various embryological tissues. Comment.

4. Write short notes on the following (**Any three**):
(5×3=15)

(i) Female Germ Unit

(ii) NPC system

(iii) Polyembryony

(iv) Endosperm haustoria

5. Draw well-labelled diagrams of the following (**any three**):
(5×3=15)

(i) T.S. of a mature anther

(ii) Bitegmic, anatropous ovule with *Fritillaria* type embryo sac

(iii) Steps involved in the entry of pollen tube in the embryo sac

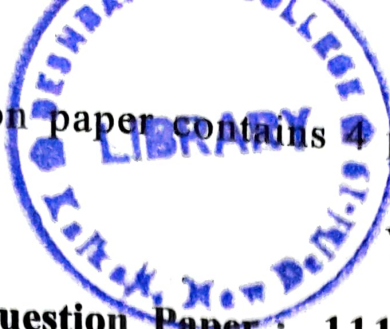
(iv) Ultrastructure of Egg Cell

6. (a) Trace the development of a typical dicot embryo and elaborate on embryo patterning. (8)

(b) What is a Male Germ Unit, and why is it important in double fertilization? (7)

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[This question paper contains 4 printed pages.]



24/12/24
Your Roll No.....

Sr. No. of Question Paper : 1112

I

Unique Paper Code : 2162013503

Name of the Paper : Plant Physiology

Name of the Course : B. Sc. (Hons.) Botany

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Only four questions are required to be attempted in all.
3. Question 1 is compulsory.
4. All questions carry equal marks.
5. Attempt all parts of every question together.
6. Illustrate your answers wherever possible.

P.T.O.

1. (a) Define the following briefly (any five):

(5 × 1 = 5)

- (i) Osmosis
- (ii) Aeroponics
- (iii) Etiolation
- (iv) Photomorphogenesis
- (v) Bolting effect
- (vi) Bioassay

(b) Fill in the blanks (any five):

(5 × 1 = 5)

- (i) The water potential of pure water is _____.
- (ii) _____ is also called as stress phytohormone.
- (iii) Membrane channels that facilitate transport of water are called _____.
- (iv) A cell becomes flaccid after being kept in _____ solution.
- (v) Gene expressed before FT (full name of FT mention her-----) during flowering is known as _____.

(vi) Ordinary companion cells with development of finger-like wall ingrowths are called _____.

(c) Name any five of the following: $(5 \times 1 = 5)$

- (i) A synthetic antitranspirant
- (ii) An ethylene-releasing compound
- (iii) Donnan equilibrium
- (iv) Photoreceptor
- (v) Chelating agent
- (vi) One example of photoblastic seed

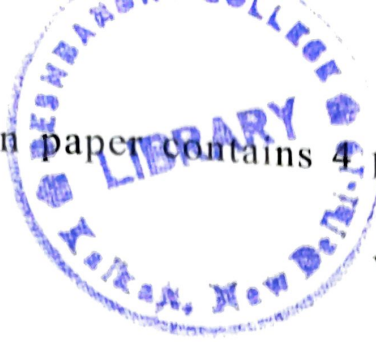
2. Differentiate between the following (any five):

$(5 \times 3 = 15)$

- (i) Passive and active transport
- (ii) Phloem loading and unloading
- (iii) Scarification and stratification
- (iv) Apoplast and symplast
- (v) Climacteric and non-climacteric fruits
- (vi) Guttation and transpiration

3. Write short notes on (any three): (3 × 5 = 15)
- (i) Hydroponics
 - (ii) Brassinosteroids
 - (iii) Cohesion-tension theory
 - (iv) Aphid stylet technique
4. (a) Write an explanatory note on structure and mode of action of phytochrome. (8)
- (b) Explain the mechanism of stomatal opening and closing with reference to proton transport theory. (7)
5. (a) What is photoperiodism? Discuss three general categories of photoperiodic responses with reference to day length. (5)
- (b) Describe the physiological role of auxins in plants with suitable diagram. (5)
- (c) Discuss the criteria of essentiality of elements and biological roles of phosphorus and calcium in plants. (5)

[This question paper contains 4 printed pages.]



01/01/2025 R

Your Roll No.....

Sr. No. of Question Paper : 1179

I

Unique Paper Code : 2163013005

Name of the Paper : Plant Pathology (DSE)

Name of the Course : **B.Sc. (H) Botany / B.Sc. Life Science**

Semester : V

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all, including question number 1, which is compulsory.
3. **All** questions carry equal marks.
4. Draw diagrams wherever required.

1. (a) Define the following (**any five**) (1×5=5)

(i) Hyperparasite

(ii) Appressorium

P.T.O.

- (iii) Hypersensitive response (Hr)
- (iv) Cenocentrum
- (v) Epidemiology
- (vi) Haustorium

(b) Match the following (**any five**) : (1×5=5)

- | | |
|------------------------------|--|
| (i) Bengal famine | (a) SAR |
| (ii) Heteroecious life cycle | (b) Zoospore |
| (iii) Salicylic acid | (c) <i>Phytophthora infestans</i> |
| (iv) Motile spore | (d) <i>Trichoderma</i> |
| (v) Biocontrol fungus | (e) <i>Alternaria solani</i> |
| (vi) Early blight of potato | (f) <i>Puccinia graminis</i> f. sp. <i>tritici</i> |

(c) Fill in the blanks : (1×5=5)

(i) Enlargement of an organ or tissue due to an increase in size of its cells is called _____ .

(ii) _____ is the network of hypha making up the body of fungi.

(iii) The interactions of the three components of disease, i.e. pathogen, host and _____ are represented as a triangle called the disease triangle.

(iv) A disease is classified as an _____ disease when it is constantly present and confined to a particular region.

(v) Vein clearing of Bhindi is caused by _____ .

2. Differentiate between **(any two)** (7.5×2=15)

(a) Yellow and brown rust of wheat

(b) Downy and Powdery mildew

(c) Early blight and Late blight of Potato

(d) Pandemic, epidemic and sporadic diseases

3. Draw diagrams **(any three)**

(5×3=15)

(a) Life cycle of citrus canker

(b) Various structures formed by predator fungi

(c) V.S. of barberry leaf showing rust infection

(d) Events that takes place during penetration of a pathogen into the host

4. Write short notes on **(any three)** (5×3=15)

(a) Physical methods of disease control

(b) Contributions of Louis Pasteur

(c) Forecasting of Plant diseases

(d) Koch's postulates

5. (a) What is Biological control? Discuss various terms like- antibiosis, ISR and hyper-parasitism. (7.5)

(b) Briefly describe the role of plant quarantine in control of diseases and its significance. (7.5)

6. Discuss about the causal organism, symptoms, disease cycle and control measures for Late blight of potato disease. (15)

[This question paper contains 8 printed pages.]



16/12/24

Your Roll No.....

Sr. No. of Question Paper : 5823

I

Unique Paper Code : 32161501

Name of the Paper : Reproductive Biology of Angiosperms

Name of the Course : B.Sc. (Hons.) Botany

Semester / Mode : V (CBCS)

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all including Question Number **1** which is compulsory.
3. All parts of a question must be answered together.
4. **All** questions carry equal marks.
5. Draw well-labelled diagrams and write the botanical name wherever necessary.

P.T.O.

1. (a) State whether the following statements are true or false. (1×5=5)

(i) Tapetum forms the outermost anther wall layers that surround the sporogenous tissue.

(ii) Monosporic embryo sac is 7 celled and 8 nucleate structure.

(iii) Cheiropterophily is the pollination by insects.

(iv) S.G Nawaschin discovered the double fertilization.

(v) G.B. Amici has been given the credit of revealing the role of pollen in fertilization.

(b) Fill in the blanks : (1×5=5)

- (i) Pollination that takes place with the help of beetles is called _____ .
- (ii) The expulsion of seed, brought about by the turgidity is called _____ .
- (iii) Nutrient rich nucellar tissue that persists in mature seed is called _____ .
- (iv) _____ demonstrated the possibility of raising large numbers of haploids from pollen grains of *Datura innoxia*.
- (v) The megasporangium together with integuments is called _____ .

(c) Match the following :

(1×5=5)

Column A

Column B

- | | |
|----------------------------------|--|
| a. <i>Aristolochia elegans</i> | i. Pseudocopulation |
| b. <i>Quinchamalium chilense</i> | ii. Five types of microspore tetrads |
| c. <i>Plumbago zeylanica</i> | iii. Finger like projections in egg cell |
| d. <i>Ophrys speculum</i> | iv. Synergid and antipodal haustoria |
| e. <i>Fritillaria</i> | v. Bambacioni effect |

2. Write short note on any **five** of the following :
(3×5=15)

- (i) Role of synergids in fertilization

(ii) Importance of polyembryony

(iii) Helobial endosperm

(iv) Nemec phenomenon

(v) Obturator

(vi) Pollen Wall

3. Differentiate between (**any three**) (3×5=15)

(i) Egg cell and Synergids

(ii) 2-celled and 3-celled pollens

(iii) Gametophytic and Sporophytic self-incompatibility

(iv) Hyphydrophily and ephydrophily

4. Briefly explain the following :

(a) Give the biological significance of seed dispersal phenomenon. (5)

(b) Describe briefly apomixis and its significance. (5)

(c) List six types of embryogeny and explain the embryo development in *Paeonia*. (5)

5. Answer the following :

(a) Write briefly on transformation of egg cell through pollen tube pathway method. (5)

(b) Role of tapetum in pollen development. (5)

(c) Describe any two methods to overcome self-incompatibility in plants. (5)

6. (a) Describe in detail any two methods to test Pollen viability. (5)

(b) Briefly explain any two types of Germline transformation methods. (5)

(c) Comment on Male Germ Unit and its structure with examples. (5)

7. Draw well labelled diagram of the following (any two) : (2×7.5=15)

(i) L.S. of anatropous, bitegmic, crassinucellate ovule showing *Polygonum* type of embryo sac.

(ii) T.S. young tetrasporangiate anther showing sporogenous tissue.

- (iii) Describe the structure of mature *Polygonum* type of embryo sac with the help of labeled diagram.

[This question paper contains 4 printed pages.]



19/12/24 R
Your Roll No.....

Sr. No. of Question Paper : 5877

I

Unique Paper Code : 32161502

Name of the Paper : Plant Physiology

Name of the Course : B.Sc. (Hons) Botany

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Five** questions in all including Question 1 which is compulsory.
3. **All** questions carry equal marks.
4. Attempt all parts of the question together.
5. Illustrate your answers wherever possible.

1. (a) Define any **five**

(5×1=5)

(i) Osmosis

(ii) Bioassay

(iii) Critical day length

P.T.O.

- (iv) Etiolation
- (v) Senescence
- (vi) Photomorphogenesis

(b) Fill in the blanks :

(5×1=5)

- (i) Precursor of Hormone ethylene is _____ .
- (ii) The protein part of phytochrome is known as _____ .
- (iii) Membrane channels which facilitate transport of water are called _____ .
- (iv) The hydrostatic pressure which develops in a cell from time to time due to osmotic diffusion of water is called _____ .
- (v) The water potential of pure water is _____ .
- (vi) Hormone that could replace the vernalization _____ .

(c) Write the significant contribution of any **five** of the following : (5×1=5)

- (i) J. Levitt
- (ii) F.W. Went

- (iii) Bennet-Clark
- (iv) A. Fick
- (v) Priestley
- (vi) Garner and Allard

2. Differentiate between **(Any five)** (5×3=15)

- (a) Guttation and Transpiration
- (b) Simple and facilitated diffusion
- (c) Phloem loading and unloading
- (d) Micro and macro elements
- (e) Apoplast and Symplast
- (f) Hormones and enzymes

3. Write short notes on **(any three)** (3×5=15)

- (a) Brassinosteroids
- (b) Hydroponics
- (c) Cohesion-tension theory
- (d) Phytosiderophores
- (e) Apical dominance

4. (a) Discuss the concept and importance of water potential. Describe different components of water potential. (5)
- (b) Write an explanatory note on discovery and physiological roles phytochrome. (5)
- (c) Describe the most widely accepted mechanism of phloem translocation in angiosperms with the help of suitable diagram. (5)
5. Attempt **any two** from the following : (7.5×2=15)
- (a) What is photoperiodism? Discuss three general categories of photoperiodic response with reference to day length.
- (b) Describe the physiological role of auxin in plants.
- (c) Discuss essential nutrient elements, criteria of essentiality and role of Nitrogen and Calcium in plants.
6. (a) Give an account of classification of enzymes. (5)
- (b) Elaborate the carrier concept of mineral uptake. (5)
- (c) Give a brief account of factors affecting transpiration. (5)