

## Rekha V.V.I. Questions for 2022 Examination

*Answers of below mentioned questions are present in your  
Rekha Examination Guide Part-II Botany – III (Hons.)*

- |  |          |
|--|----------|
| 1. Write short notes on the following :  |          |
| (i) Process of fossilization <b>V. V. I.</b>                                       | ..... 7  |
| (ii) Petrified types of fossils <b>V. V. I.</b>                                    | ..... 8  |
| (iii) Importance of fossils  | ..... 8  |
| (iv) Compression types of fossils  | ..... 9  |
| (v) Incrustation fossils   | ..... 9  |
| (vi) Lagenostoma lomaxi <b>V. V. I.</b>  | ..... 9  |
| (vii) Sulphur shower   | ..... 10 |
| (viii) Ovule of Pinus <b>V. V. I.</b>  | ..... 10 |
| (ix) Transfusion tissue  | ..... 12 |
| (x) Economic importance of Taxus   | ..... 12 |
| (xi) Morphological and anatomical features of Taxus leaf <b>V. V. I.</b>           | ..... 12 |
| (xii) Development of male gametophyte in Taxus <b>V. V. I.</b>                     | ..... 13 |
| (xiii) Development of male gametophyte in Gnetum <b>V. V. I.</b>                   | ..... 14 |
| (xiv) Binomial System of nomenclature<br><b>Or, Binomial nomenclature V. V. I.</b> | ..... 15 |
| (xv) Merits of Bentham and Hooker system of classification                         | ..... 16 |
| (xvi) Merits of Hutchinson classification  | ..... 17 |
| (xvii) Role of Palynology in Taxonomy  | ..... 17 |
| (xviii) Role of Embryology in Taxonomy <b>V. V. I.</b>                             | ..... 18 |
| (xix) Characteristic features of family Apocynaceae                                | ..... 19 |

### Group – A

## PALAEOBOTANY AND GYMNOSPERM

- |   |          |
|---|----------|
| 1. What is Fossilisation ? Describe the process (methods) of Fossilisation. <b>V. V. I.</b>   | ..... 20 |
| 2. What is Fossil ? Write down the various types of fossils.<br><b>Or, Describe the types of fossils with suitable examples. V. V. I.</b> | ..... 22 |
| 3. Describe the salient features of Lyginopteris (Lyginodendron) oldhamia. <b>V. V. I.</b>  | ..... 25 |
| 4. Write the salient features of Cycadeoidea (Bennettites) with suitable diagrams. <b>V. V. I.</b>  | ..... 26 |
| 5. Write down the salient features of fructification of Cycadeoidea.  | ..... 30 |

6. Write descriptive note on the following : **V. V. I.**
- (a) Needle of Pinus. .... 33
- (b) Ovuliferous scale of Pinus. .... 35
- (c) Development of male gametophyte of Pinus. .... 36
- (d) Embryo development in Pinus. .... 38
7. Discuss the morphological nature of the ovuliferous scale of Pinus. .... 38
8. Write with suitable diagrams embryogeny in Pinus. **V. V. I.** .... 40
9. Describe the morphological features of genus Pinus with reference to fructification. **V. V. I.** .... 44
10. Write descriptive notes on the following :
- (a) Stem of Taxus .... 48
- (b) Ovule of Taxus .... 50
11. Describe the female flower of Taxus with suitable diagrams. .... 51
12. Give a comparative account of male gametophyte of Pinus and Taxus. .... 53
13. Illustrate the angiosperm like features of Gnetum. Why this genus is considered as ancestral to the angiosperms ?  
**Or**, Enumerate the angiospermic features of Gnetum. Discuss how it is progenitor of Angiosperms. .... 54
14. Describe the male and female strobilus of Gnetum with suitable diagrams. **V. V. I.** .... 56

**Group – B**

**ANGIOSPERM TAXONOMY**

1. What is binomial system of nomenclature ? Discuss its importance. **V. V. I.** .... 60
2. What do you understand by natural system of classification ? Write down the system of classification proposed by Bentham and Hooker. .... 61
3. What is phylogeny ? Describe any phylogenetic system of classification with its merits and demerits. **V. V. I.**  
**Or**, Describe the system of classification given by Hutchinson. .... 66
4. Write the principles of phylogeny given by Hutchinson. Discuss its demerits. **V. V. I.** .... 68
5. Give an account of role of Palynology in Taxonomy. **V. V. I.** .... 69
6. Give an account of role of Embryology in Taxonomy. .... 71
7. Give an account of the importance of cytology in Taxonomy.  
**Or**, Summarise the role of cytology in relation to Taxonomy. .... 73
8. Ranunculaceae is considered a primitive family. Discuss. **V. V. I.** .... 75

9. Describe the floral characters of the family *Ranunculus* along with floral formula and floral diagram. .... 76
10. Describe the floral characters of the family *Apocynaceae* along with floral formula and floral diagram. .... 77
11. Discuss the economic importance of family *Apocynaceae*.  
**Or**, Write common name, botanical name and economic importance of any three plants belonging to the family *Apocynaceae*. .... 78
12. Discuss the economic importance of family *Lamiaceae* (*Labiatae*).  
**Or**, Write down the economic importance of family *Lamiaceae* with common names and botanical names of any five medicinal plants of this family. .... 79
13. Describe the floral characters of the family *Verbenaceae* along with floral formula and floral diagram. .... 80
14. Discuss the economic importance of *Verbenaceae* family.  
**Or**, Write common name, botanical name and economic importance of any five plants belonging to the family *Verbenaceae*. .... 81
15. Write the diagnostic floral characters, floral formula and floral diagram of family *Polygonaceae*. **V. V. I.** .... 82
16. Describe the diagnostic features of the family *Euphorbiaceae* along with their floral formula and floral diagram. **V. V. I.** .... 83
17. Write the diagnostic floral characters, floral formula and floral diagram of family *Poaceae* (*Gramineae*). **V. V. I.** .... 84
18. Write the economic importance of family *Poaceae* (*Gramineae*) with suitable genus and species. .... 85
19. Write short notes on the following : **V. V. I.**
- (a) Pollinium .... 88
  - (b) Principles of International Code of Botanical Nomenclature (I.C.B.N.) .... 88
  - (c) Phylloclade .... 88
  - (d) Verticillaster inflorescence .... 88
  - (e) Cleavage polyembryony .... 89
  - (f) *Euphorbia* .... 89
  - (g) Demerits of Hutchinson's system of classification. .... 89

## **BOTANY – 3 (Hons.) (2021)**

Answer Five questions

Selecting at least one from each group

Q. No.1 is compulsory.

1. Write explanatory notes on any three of the following :
  - (a) Importance of fossils ..... 8
  - (b) Anatomical features of Pinus needle.
  - (c) Role of cytology in Taxonomy ..... 73
  - (d) Merits of Hutchinson system of classification. .... 17
  - (e) Identification characters of Family Apocynaceae. .... 19

### **Group-A**

2. Write the salient features of cycadeoidea with suitable diagrams. .... 30
3. Describe the Angiospermic features and economic importance of Gnetum. .... 54
4. Describe the process of fertilization in Taxus with suitable diagrams.
5. Describe the life cycle of Pinus.

### **Group-B**

6. Describe the system of classification of angiosperms given by Bentham and Hooker. .... 61
  7. Describe the role of Embryology in Taxonomy. .... 71
  8. Write the floral characters, floral formula and floral diagram of family Ranunculaceae. .... 76
  9. Write the diagnostic floral characters, floral formula and floral diagram of Family Lamiaceae. .... 79
  10. Describe the family verbenaceae. .... 81
- Or,** Describe the role of nomenclature set by ICBN. .... 88

## **BOTANY – 3 (Hons.) (2020)**

Answer five questions selecting atleast one from each Group in which Q. No. 1 is compulsory.

1. Write explanatory notes on any three of the following :
  - (a) Ovule of Pinus ..... 10
  - (b) Development of male gametophyte of Taxus. .... 13
  - (c) Morphological and anatomical features of Taxus leaf. .... 12
  - (d) Role of embryology in taxonomy .... 18
  - (e) Characteristic features of family Apocynaceae .... 19

### **Group-A**

2. Write the salient features of Lyginodendron with suitable diagrams. .... 25
3. What are Fossils? Describe the various methods of Fossilization. .... 20
4. Describe the male and female strobilus of Gnetum with suitable diagrams. .... 56
5. Write descriptive notes on any two of the following :
  - (a) Development of male gametophyte of Pinus .... 36
  - (b) Embryo development in Pinus .... 38
  - (c) Ovule of Taxus .... 50
  - (d) Wood of Taxus

### **Group-B**

6. What is binominal system of nomenclature ? Discuss its importance. .... 60
7. Describe the system of classification of angiosperms given by Hutchinson. .... 66
8. Write the diagnostic floral characters, floral formula and floral diagram of family polygonaceae. .... 82
9. Write floral characters, floral formula and floral diagram of family Poaceae. .... 84
10. Write short notes on any two of the following :
  - (a) Role of Paleontology in taxonomy. .... 69
  - (b) Write the botanical name of three plants belonging to family Euphobiaceae along with floral formula and floral diagram. .... 83
  - (c) Merit of Bentham and Hooker's system of classification. .... 16
  - (d) Write the demerits of Hutchinson's system of classification. .... 68

## **BOTANY - 3 (Hons.) (2019)**

Answer five questions, selecting at least one from each Group, in which Q. No.1 is compulsory.

1. Write explanatory notes on any three of the following :
 

(a) Importance of fossils	..... 8
(b) Process of fossilization	..... 7
(c) Petrified types of fossils	..... 8
(d) Development of Male gametophyte in Gnetum	..... 14
(e) Merits of Hutchinson classification.	..... 17

### **Group-A**

2. Write the Salient features of Cycadeoidea with suitable diagrams. ..... 26
3. Enumerate the Angiospermic features of Gnetum. Discuss how it is progenitor of Angiosperms. ..... 54
4. Write descriptive note on the following :
 

(a) Ovuliferous scale of Pinus	..... 35
(b) Needle of Pinus	..... 33
5. Describe the characteristic features of Taxus. Discuss its importance.

### **Group-B**

6. Describe the Bentham and Hooker's system of Angiospermic classification. ..... 61
7. Summarise the role of cytology in relation to Taxonomy. ..... 73
8. Give the floral characteristics, floral formula and floral diagram of the family Verbenaceae. ..... 81
9. Ranunculaceae is considered a primitive family. Discuss. ..... 75
10. Write short notes on any two of the following :
 

(i) Seed of Gnetum	
(ii) Verticillaster inflorescence	..... 88
(iii) Cleavage polyembryony	..... 89
(iv) Euphorbia	..... 89

## **BOTANY - 3 (Hons.) (2018)**

Answer five questions, selecting at least one from each Group, in which Q.No. 1 is compulsory.

1. Write all the following questions in brief in approximately 250 words each :
 

(a) Compression types of fossils	..... 9
(b) Lagenostoma lomaxii	..... 9
(c) Development of male gametophyte in Taxus	..... 13
(d) Binomial Nomenclature	..... 15
(e) Taxonomic significance of Embryology	

### **Group-A**

2. Write down the salient features of Lyginopteris oldhamia with suitable diagram. ..... 25

3. Describe the types of fossils with suitable examples. .... 22
4. Describe the morphological features of genus Pinus with reference to fructifications. .... 44
5. Write with suitable diagrams embryogeny in Pinus. .... 40

**Group-B**

6. Write the principles of phylogeny given by Hutchinson. Discuss its demerits. .... 68
7. Write short notes on any two of the following :
  - (a) Pollinium .... 88
  - (b) Principles of International Code of Botanical Nomenclature (I.C.B.N.) .... 88
  - (c) Author Citation .... 88
  - (d) Phylloclade .... 88
8. Describe the floral characters of the family Apocynaceae along with floral formula and floral diagram. .... 77
9. Write the economic importance of family poaceae with suitable genus and species. .... 85

**BOTANY - 3 (Hons.) (2017)**

*Answer five questions, selecting at least one from each Group, in which Q.No. 1 is compulsory.*

1. Write all the following questions in brief (in approximately 250 words each) :
  - (a) Petrifications .... 8
  - (b) Importance of Fossils .... 8
  - (c) Transfusion tissue .... 12
  - (d) Merits of Bentham and Hooker System of classification .... 16
  - (e) Role of playnology in taxonomy. .... 17

**Group-A**

2. What is Fossil ? Write down the various types of fossils. .... 22
3. Write down the salient features of fructification of Cycadeoidea. .... 30
4. Describe the female flower of Taxus with suitable diagrams. .... 51
5. Illustrate the angiosperm like features of Gnetum. Why this genus is considered as ancestral to the angiosperms ? .... 54

**Group-B**

6. What do you understand by natural system of classification ? Write down the system of classification proposed by Bentham and Hooker. .... 61
7. Give an account of the importance of Cytology in taxonomy. .... 73
8. Describe the floral characters of the family Ranunculaceae or Verbenaceae along with floral formula and floral diagram. ....76,80
9. Write down the economic importance of family Lamiaceae with common names and botanical names of any five medicinal plants of this family. .... 79

## Rekha V.V.I. Questions for 2022 Examination

*Answers of below mentioned questions are present in your  
Rekha Examination Guide Part-II Botany – IV (Hons.)*

### SHORT ANSWER TYPE QUESTIONS

- |     |  |       |    |
|-----|--|-------|----|
| 1.  | Name all the types of meristems based on function.   | ..... | 7  |
| 2.  | Name the three main categories of meristems on the basis of their position in the plant body.  | ..... | 7  |
| 3.  | Give an account of the salient features of Tunica - Corpus theory of Apical meristem.  | ..... | 8  |
| 4.  | The Quiescent Centre <b>V. V. I.</b>   | ..... | 9  |
| 5.  | Root apex organisation <b>V. V. I.</b>   | ..... | 9  |
| 6.  | Write down the anatomical characteristics of Dracaena stem.  | ..... | 10 |
| 7.  | Write down the important anatomical characteristics (peculiarities) of Boerhaavia stem. <b>V. V. I.</b>  | ..... | 10 |
| 8.  | Enumerate the anatomical characteristics of the stem of Achyranthes. <b>V. V. I.</b>   | ..... | 10 |
| 9.  | Anatomical features of hydrophytes.  | ..... | 11 |
| 10. | Chief anatomical features of xerophytic leaf. <b>V. V. I.</b>  | ..... | 12 |
| 11. | Write about various parts of the ovule in relation to Megasporogenesis.  | ..... | 12 |
| 12. | What is the difference between amoeboid tapetum and secretory tapetum ?  | ..... | 13 |
| 13. | Describe the typical eight nucleate embryo sac. <b>V. V. I.</b>  | ..... | 13 |
| 14. | What are the causes of Polyembryony ? Discuss in brief. <b>V. V. I.</b>  | ..... | 14 |
| 15. | Dicot embryo. <b>V. V. I.</b>  | ..... | 14 |
| 16. | Describe the mechanism of pollination affected by any one agency.  | ..... | 15 |
| 17. | Describe the process of Chalazogamy.   | ..... | 15 |
| 18. | Describe the medicinal value of Hibiscus rosa-sinensis and ocimum sanctum. <b>V. V. I.</b>   | ..... | 15 |
| 19. | Give the botanical names and families of three pulses of Bihar.  | ..... | 16 |
| 20. | Write down the botanical names and families of any three cereals of Bihar.   | ..... | 16 |
| 21. | Write down the names of three medicinal plants of Bihar with their scientific names and families to which they belong. Also mention their economic importance. | ..... | 16 |
| 22. | Mention the botanical names, family and economic importance of any three fruits grown in Bihar. <b>V. V. I.</b>  | ..... | 17 |



**Group – A**  
**ANATOMY**

1. What are meristems ? How are they classified ? Describe the structure and function of different kinds of meristems found in dicotyledonous plants. **V. V. I.**  
**Or,** Give a brief account of meristematic tissues and its organisation in monocots. ..... 18
2. Describe the various theories relating to the growth and development of root apex. **V. V. I.**  
**Or,** Describe various hypothesis regarding root apex organisation in plants. ..... 21
3. Describe various theories relating to the shoot apex organisation in higher plants.  
**Or,** Briefly discuss the theories of structural development and differentiation of shoot apex in flowering plants. ..... 24
4. What are the principles of distribution of mechanical tissue in plants ? Explain giving examples. **V. V. I.** ..... 28
5. Describe the structure and function of mechanical tissues in plants. **V. V. I.** ..... 32
6. What do you mean by anomalous secondary growth ? Describe anomalous secondary growth in Nyctanthes.  
**Or,** Define anomalous secondary growth. Describe it in any one of the plant studied by you. ..... 35
7. What do you mean by Anomalous secondary growth ? Describe anomalous secondary growth in Tecoma stem. ..... 36
8. Draw a diagram showing anomalous peculiarities in Dracaena stem. **V. V. I.** ..... 37
9. Give an account of organisation of tissues in relation to hydrophytes. **V. V. I.**  
**Or,** Describe the organisation of tissues in plants growing in aquatic habitats. ..... 38
10. Describe environmental adaptation in Xerophytes giving suitable examples.  
**Or,** Describe the organisation of tissues in plants growing in dry environment citing suitable examples. ..... 42
11. Write notes on the following : **V. V. I.**
  - (a) Collenchyma ..... 45
  - (b) Sclereids ..... 46
  - (c) Vascular cambium ..... 47

- |                    |      |    |
|--------------------|------|----|
| (d) I – Girder     | .... | 47 |
| (e) Sclerenchyma   | .... | 48 |
| (f) Vessels        | .... | 49 |
| (g) Sieve tubes    | .... | 50 |
| (h) Medullary rays | .... | 51 |

**Group – B**

**EMBRYOLOGY AND APPLIED BOTANY**

- |  |      |    |
|--|------|----|
| 1. Describe briefly the development of microspores in angiosperms.   | .... | 52 |
| 2. With the help of diagrammatic sketches, describe the development of female gametophyte in angiosperms.  | .... | 54 |
| 3. Give an elaborate account of double fertilization in angiosperms.   | .... | 57 |
| 4. Describe the development of different types of tetrasporic embryo-sacs in Angiosperms giving suitable diagrams.   | .... | 60 |
| 5. What do you mean by endosperm ? Mention its types with suitable examples. <b>V. V. I.</b><br><b>Or,</b> Describe the types and function of endosperm.<br><b>Or,</b> Give an illustrated account of development of cellular endosperm with suitable examples.  | .... | 63 |
| 6. Give an account of the development of dicotyledonous embryo. <b>V. V. I.</b><br><b>Or,</b> Describe the development of dicot embryo in flowering plants.  | .... | 66 |
| 7. Describe the structure and development of typical monocot embryo. <b>V. V. I.</b>   | .... | 71 |
| 8. Give a brief account of Polyembryony with suitable examples. <b>VVI</b>   | .... | 73 |
| 9. Give a general account of tools and techniques of tissue culture in higher plants.  | .... | 74 |
| 10. Give an outline of the principles of tissue culture technique and importance of tissue culture. <b>V. V. I.</b>  | .... | 77 |
| 11. Describe five medicinal plants of your locality. Give botanical names and families of the plants.<br><b>Or,</b> Write the botanical name of five medicinally important plants found in Bihar and describe their medicinally important parts. <b>V. V. I.</b> | .... | 78 |
| 12. Describe the economic values and systematic position of any five pulse yielding plants of Bihar.   | .... | 80 |
| 13. Write down the economic values of any five oil producing seeds with their botanical names and the families.  | .... | 82 |

14. Write the botanical names of five important vegetables in Bihar. Assign them to their respective families and point out their economic values.  
**Or,** Describe the economic values and systematic position of any five vegetable plants growing in Bihar. **V. V. I.** ..... **85**
15. Write short notes on the following : **V. V. I.**
- (i) Microsporogenesis ..... **86**
  - (ii) Anther wall ..... **87**
  - (iii) Types of Microspore tetrad ..... **87**
  - (iv) Tapetum ..... **88**
  - (v) Pollen grains ..... **88**
  - (vi) Megasporogenesis ..... **89**
  - (vii) Nucellus ..... **90**
  - (viii) Apomixis ..... **90**
  - (ix) Bisporic embryo sac ..... **91**
  - (x) Monosporic embryo sacs ..... **91**
  - (xi) Synergids ..... **92**
  - (xii) Endosperm haustoria ..... **92**
  - (xiii) Helobial endosperm ..... **93**
  - (xiv) Self pollination (Autogamy) ..... **93**
  - (xv) Double Fertilization ..... **94**
  - (xvi) Polyembryony ..... **94**
  - (xvii) Practical values of Polyembryony ..... **95**
  - (xviii) Cleavage Polyembryony ..... **95**
  - (xix) Callus ..... **96**
  - (xx) Economic Importance of Brassica campestris ..... **96**

## **BOTANY – 4 (Hons.) (2021)**

1. Answer any three questions of the following :
  - (a) Classification of tissues.
  - (b) Salient features of Hydrophytes. .... 11
  - (c) Micro gametogenesis.
  - (d) Give the Botanical name, family of Maize and its economical importance.
  - (e) Medicinal value of *Andrographis paniculata*.

### **Group-A**

2. What are the different theories for shoot apex organisation? Explain in brief. .... 24
3. Write and draw the anatomical peculiarities of *Nyctanthus* stem. .... 35
4. Give the anatomical features of xerophytes. .... 42
5. Write short notes on any two of the following : .... 45
  - (a) Significance of anomalous secondary growth.
  - (b) Parenchyma
  - (c) Aerenchyma tissue
  - (d) Nodal anatomy

### **Group-B**

6. Describe in detail the process of Megasporogenesis in plants. .... 89
7. What is explant ? Explain the types of explants which are used in plant tissue culture.
8. Give the Botanical name, family and economic importance of three pulses cultivated in Bihar .... 80
9. Describe in detail about the Tetrasporic or Bisporic embryo sac development in angiospermic plants. .... 60
10. Write short notes on any three of the following: .... 86
  - (a) Drupe
  - (b) Wheat
  - (c) Nuclear Endosperm
  - (d) Syngamy
  - (e) Technique of Embryo culture

## **BOTANY – 4 (Hons.) (2020)**

Answer five questions, selecting at least one from each  
Group in which Q. No.1 is compulsory.

1. Answer any three questions of the following :
  - (a) Root apex organisation. ..... 9
  - (b) Anatomical features of hydrophytes. ..... 11
  - (c) Describe the medicinal value of *Ocimum sanctum* and *Hibiscus rosa sinensis*. ..... 15
  - (d) Microgametogenesis ..... 86
  - (e) Dicot embryo ..... 14

### **Group-A**

2. Describe the structure and function of mechanical tissues in plant. ..... 32
3. Write and draw the anatomical peculiarities of *Boerhavia* stem. ..... 10
4. Give a brief account of meristimatic tissues and its organisation in monocots. ..... 18
5. Draw a colourful diagram showing anomalous peculiarities in *Dracaena* stem. ..... 37

### **Group-B**

6. Describe the types and function of endosperm. ..... 63
7. Give a brief account of polyembryony with suitable examples. ..... 73
8. Write the botanical name of five medicinally important plant found in Bihar and describe their medicinally important parts. ..... 78
9. Describe the economic values and systemic position of any five vegetable plants growing in Bihar. ..... 85
10. Write short notes on any two of the following :
  - (a) Microsporogenesis ..... 86
  - (b) Callus ..... 96
  - (c) Economic importance of *Brassica Campestris*. ..... 96
  - (d) Monosporic embryo sac ..... 91

## **BOTANY - 4 (Hons.) (2019)**

Answer five questions, selecting at least one from each  
Group, in which Q. No.1 is compulsory.

1. Answer any three questions in brief :
  - (a) Anatomical Peculiarities of *Boerhaavia*. ..... 10
  - (b) Chief anatomical features of xerophytic leaf. ..... 12
  - (c) Quiescent centre. ..... 9
  - (d) Mention the botanical names and economic importance of any three fruits grown in Bihar. ..... 17
  - (e) Describe the typical eight nucleate embryo sac. ..... 13

**Group-A**

- |  |       |    |
|--|-------|----|
| 2. Briefly discuss the theories of structural development and differentiation of shoot apex in flowering plants.                                     | ..... | 24 |
| 3. Describe the organisation of tissues in plants growing in aquatic habitats.   | ..... | 38 |
| 4. What are meristems ? How are they classified? Describe the structure and function of different kinds of meristems found in dicotyledonous plants. | ..... | 18 |
| 5. Write notes on any three of the following :   |       |    |
| (a) Collenchyma  | ..... | 45 |
| (b) Sclerenchyma   | ..... | 48 |
| (c) Sieve-tube   | ..... | 50 |
| (d) Medullary rays   | ..... | 51 |
| (e) Vessels  | ..... | 49 |

**Group-B**

- |  |       |    |
|--|-------|----|
| 6. Describe the development of different types of tetrasporic embryo-sacs in Angiosperms giving suitable diagrams. | ..... | 60 |
| 7. Write short notes on any three of the following :   |       |    |
| (a) Megasporogenesis   | ..... | 89 |
| (b) Polyembryony   | ..... | 94 |
| (c) Pollen grains  | ..... | 88 |
| (d) Apomixis   | ..... | 90 |
| (e) Double fertilization   | ..... | 94 |
| 8. Describe the economic values and systematic position of any five Pulse Yielding Plants of Bihar.                | ..... | 80 |
| 9. Describe the structure and development of typical monocot embryo.   | ..... | 71 |
| 10. Give an out-line of the principles of tissue-culture, technique and importance of tissue culture.              | ..... | 77 |

**BOTANY - 4 (Hons.) (2018)**

*Answer five questions, selecting at least one from each Group, in which Q.No. 1 is compulsory.*

- |   |       |    |
|---|-------|----|
| 1. Answer all the questions in short :  |       |    |
| (a) Give an account of the salient features of Tunica-corpus theory of Apical meristem. | ..... | 8  |
| (b) Enumerate the anatomical characteristics of the stem of Achyranthes.                | ..... | 10 |
| (c) Write about various parts of the ovule in relation to megasporogenesis.             | ..... | 12 |
| (d) What are the causes of polyembryony ? Discuss in brief with examples.               | ..... | 14 |

- (e) Write down the names of an three medicinal plants of Bihar with their scientific names and families to which they belong. Also mention their economic importance. .... 16

**Group-A**

2. What are the principles of distribution of mechanical tissues in plants ? Explain with the help of suitable examples. .... 28
3. Describe the organisation of tissues in plants growing in dry environment citing suitable examples. .... 42
4. Describe various hypothesis regarding root apex organisation in plants. .... 21
5. Define anomalous secondary growth. Describe it in any one of the plant studied by you. .... 35

**Group-B**

6. Describe the development of microspores in angiosperms. .... 52
7. What do you understand by endosperm ? Mention its types with suitable examples. .... 63
8. Describe the development of dicot embryo in flowering plants. .... 66
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