

**BOTANY****Paper – II**

Time Allowed : Three Hours

Maximum Marks : 200

**Question Paper Specific Instructions**

*Please read each of the following instructions carefully before attempting questions :*

*There are EIGHT questions in all, out of which FIVE are to be attempted.*

*Questions no. 1 and 5 are compulsory. Out of the remaining SIX questions, THREE are to be attempted selecting at least ONE question from each of the two Sections A and B.*

*Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly struck off.*

*All questions carry equal marks. The number of marks carried by a question/part is indicated against it.*

*Answers must be written in ENGLISH only.*

*Neat sketches may be drawn, wherever required.*

**SECTION A**

- Q1. Explain each of the following :** **8×5=40**
- |  |   |
|--|---|
| (a) Suggest why prions should not be included among viruses.   | 8 |
| (b) Discuss the role of central control system in managing surveillance at check points during cell cycle. | 8 |
| (c) Give two popular examples where genetic differences influence induction of mutation.                   | 8 |
| (d) Is the genetic code universal ?  | 8 |
| (e) Explain Binomial and Poisson distribution.   | 8 |

- Q2.** (a) Describe nuclear pores and their role in nucleocytoplasmic traffic with suitable diagrams. 10+10=20
- (b) How will you distinguish cytologically between paracentric inversion and pericentric inversion? 10+10=20
- Q3.** (a)  $\frac{X}{A}$  ratio is not only a primary sex determining signal but has several major regulatory genes in function. Discuss what role do they play in sex differentiation, with suitable examples. 20
- (b) Describe multigene families with divergent members of globin genes and pseudogenes subject to the difference in expression to the time and space. 5+15=20
- Q4.** (a) Why is *Agrobacterium tumefaciens* the most popular and important tool in genetic engineering of plant systems? Describe the various steps used in T-DNA mediated transfer of foreign genes into plants. 5+15=20
- (b) What are the merits of pedigree methods? Describe the pedigree-bulk methods developed at CIMMYT, Mexico for wheat breeding. 8+12=20

## SECTION B

- Q5. Write brief notes on each of the following :** **8×5=40**
- (a) "Tricarboxylic acid cycle is an amphibolic process." Explain. 8
  - (b) "Phenolic substances are not mere metabolic waste products." Discuss. 8
  - (c) What is 'triple response growth' ? How is it induced ? 8
  - (d) How does El Niño result in extensive disruption of weather around the world ? 8
  - (e) Describe the phenomenon of 'biomagnification' with special reference to chlorinated hydrocarbons. 8
- Q6.** (a) In what way does carbon fixation pathway in malate formers differ from that in aspartate formers ? 20
- (b) Trace the physiological changes associated with the process of seed germination. How is the process of germination regulated by phytohormones ? 15+5=20
- Q7.** (a) How do seasonal variations in day length conditions influence flowering patterns of plants ? Give a comprehensive account of the structure and mode of action of the photoreceptor involved. 10+10=20
- (b) What are 'carrier proteins' ? Describe the ion uptake mechanism in plants mediated by carrier proteins. 5+15=20
- Q8.** (a) Write an account of 'Joint Forest Management Programme' (JFMP). How does people's participation ensure sustainable forest resource management ? 15+5=20
- (b) Discuss the strategies adopted for phytoremediation. Add a critical note on potentialities and limitations of phytoremediation to clean up heavy metal contaminated sites. 10+10=20