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

There are EIGHT questions divided in TWO SECTIONS and printed both in HINDI and in ENGLISH.

Candidate has to attempt FIVE questions in all.

Questions no. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE from each section.

The number of marks carried by a question / part is indicated against it.

Answers must be written in the medium authorized in the Admission Certificate which must be stated clearly on the cover of this Question-cum-Answer (QCA) Booklet in the space provided. No marks will be given for answers written in a medium other than the authorized one.

Word limit in questions, wherever specified, should be adhered to.

Diagrams/Figures, wherever required, may be drawn in the space provided for answering the question itself.

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.
खण्ड A
SECTION A

Q1. निम्नलिखित की व्याख्या कीजिए:

Explain the following: \[10\times 5 = 50\]

(a) बहुपुट्टता से बहुगणिता भिन्न है
Polyteny differs from polyploidy \[10\]

(b) पुनरूज्जन आवृतियों को प्रभावित करने वाले कारक
Factors affecting recombination frequencies \[10\]

(c) उचित उत्तरता (समंजन सुधारा) परीक्षण के रूप में कॉर्ड-स्क्वैयर परीक्षण
Chi-square test as a test of goodness of fit \[10\]

(d) सी-मान विरोधाभास
C-value paradox \[10\]

(e) रामागनिक उत्परिन्तुजन
Chemical mutagens \[10\]

Q2. (a) एफ.आई.एस.एच. में प्रयुक्त संसाधनों एवं तकनीकों की व्याख्या कीजिए एवं उनका विवरण दीजिए।

Explain and describe the tools and techniques of FISH. \[20\]

(b) न्यूक्लिओसोम (केंद्रिकाम) की मूलभूत संरचना का वर्णन कीजिए।
Describe the basic structure of a nucleosome. \[15\]

(c) “स्थानांतरण के परिणाम गंभीर होते हैं। स्थानांतरित खण्डों में स्थानांतरण न केवल जीन सहलनता को बदलता है, अपितु आसानी से हुई अर्धसूचित अनियमितताओं का भी आदान करता है।” विवेचना कीजिए।

“The consequences of translocations are profound. They lead not only to a change in gene linkage in the translocated sections but also to easily incurred meiotic abnormalities.” Discuss. \[15\]
Q3. (a) Citing suitable evidences, explain plastid inheritance in four o'clock plant.
(b) Discuss Inbreeding depression versus Heterosis.
(c) How does the Ins P_3/DAG pathway participate in the process of translocation of cellular signals?

Q4. Briefly describe the characteristics and applications of the following:

(a) Back cross method
(b) Restriction endonucleases
(c) Transgenic plants as living bioreactors
(d) Molecular markers
(e) Retroviruses as vectors
Q5. 

Explain the following:

(a) **Apoenzyme**

(b) **Ethylene as a volatile hormone**

(c) **Soil salinity also restricts the growth of plants**

(d) **Taiga or Boreal forests**

(e) **“The pyramid of energy always takes a true upright shape.” Why?**

Q6. 

(a) **Describe the role of glyoxysomes in conversion of fats into more mobile molecules.**

(b) **Distinguish between phloem loading and phloem unloading.**

(c) **What is Niche overlap? Narrate the biogeographic classifications of India.**
Q7. (a) What are the functions of the enzymes which need copper, zinc and molybdenum as their co-factors?

(b) Enumerate the effects of oil spillage and suggest the control and remedial measures of it.

(c) Define ecological succession. Describe the causes and basic types of ecological succession.

Q8. Briefly describe the given terms and emphasize their importance/significance:

(a) Recycling is an integral part of solid waste management

(b) OTEC

(c) Allosteric enzymes and Feedback control

(d) Biosafety and Bioremediation

(e) Solar pond