Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Sc. (H), (Genetics)/SEM-2/PGN-204/2011

2011
PLANT GENETICS

Time Allotted : 3 Hours *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : $10 \times 1 = 10$

   i) Totipotency is

      a) the process of dedifferentiation and redifferentiation

      b) the inherent capacity of an organism to carry out dedifferentiation and redifferentiation

      c) the inherent capacity to grow isolate organs

      d) the process of tissue culture.

   ii) The gametophyte generation begins with

      a) gametes b) spores

      c) both of these d) none of these.

iii) In pea plant flowering becomes completely blocked in case of recessive mutation in the gene

a) gigas b) sn

c) veg 1 d) none of these.

iv) When the inflorescence meristem forms a terminal flower, the species is termed as

a) determinate

b) indeterminate

c) photoperiod responsive

d) none of these.

v) DNA denaturation is a

a) unidirectional process b) reversible process

c) both (a) and (b) d) none of these.

vi) A start codon in mitochondria can be normally in nucleus, is a

a) threonine b) tryptophan

c) arginine d) none of these.

vii) Short period interspersion are single copy sequences of

a) 300 – 1200 bp b) 400 – 800 bp

c) 800 – 1000 bp d) none of these.

viii) MADS-Box genes contain a special domain called

a) *K*-domain b) *C*-domain

c) *B*-domain d) none of these.

ix) In homeotic mutants

a) the wrong organs developed in the right place

b) the right organs developed in the wrong place.

x) Cadasteral activity is known as the

a) competitive interaction between the genes

b) competitive interaction between members of different classes of genes

c) combinatorial interactions between members of different classes of genes

d) interactions between the members of same gene class.

xi) Which one is semiautonomous organelle ?

a) Mitochondria b) Peroxisome

c) Vacuole d) Golgi body.

xii) Polar body is located in

a) Micropyle b) Pollen tube

c) Embryo sac d) Egg cell

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Explain, in a haplodiplontic life cycle mitosis occurs in haploid cells to give rise a plant. Define alternation of generation. 3 + 2

3. What do you mean by temporal and spatial gene regulation ? Discuss in brief about the conserved sequence in eukaryotic promoters. 2 + 3

4. Explain the meaning of the C-value paradox. Define Tm Give an example of repetitive sequence in plant describing the structure in brief. 2 + 1 + 2

5. Discuss in brief the differences between the universal genetic code of the nuclear gene and mitochondrial genetic code in general. 5

6. What are the most common types of molecular markers ? Describe them in brief. 1 + 4

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Define plantibodies with examples. What are the basic methods of transformation in plants ? Discuss briefly introduction of foreign genes in plants by an indirect method. 4 + 1 + 10

8. What do you know about ABC model ? Explain the interactions and activities of different genes that control floral organ identity. Discuss the changes from vegetative stage to reproductive stage in a plant mentioning the role of floral commitment gene. 4 + 5 + 6

9. Mention the origin of the name 'MADS' in MADS-box genes. Give a diagrammatic representation of the basic structure of MADS-box gene of a flowering plant mentioning all the domains. What are homeotic genes ? What are the roles of 3' sequences in gene expression ? Write about the properties of trans-acting factors. 1 + 3 + 2 + 5 + 4

10. Write short notes on any *three* of the following : 3 × 5

    a) Organization of single copy sequences in plants

    b) Promiscuous DNA and RNA editing

    c) Linkage drag

    d) Enhancers and silencers

    e) cp DNA organization.

11. Discuss chromosomal manipulation in crop improvement. 15