14 (BOT–3) 3016

2023

BOTANY

Paper : BOT–3016

Full Marks : 80

Time : Three hours

The figures in the margin indicate full marks for the questions.

Write the answers in two Halves/Parts/ Groups in separate books.

PART–A

(Reproductive and Developmental Biology)

Marks : 50

1. Fill in the blanks/Choose/Write the correct answer : 1×10=10

   (i) _____ is the character of an isolated cell able to produce a fertile adult individual.

(ii) The mechanism by which the emission of a signal from one part of an embryo can determine the location, differentiation and fate of many surrounding cells is known as _____ gradient.

(iii) Egg apparatus of an embryo sac has egg and synergids. The ploidy level and number of respective cells are

Egg cell		Synergids	
Ploidy	Number	Ploidy	Number
n	1	*n*	2

Is the statement correct ? Justify.

(iv) Why is *Arabidopsis* considered as model plant ?

(v) In dicotyledonous stem peripheral growth occurs due to presence of

(a) Cortex

(b) Xylem

(c) Phloem

(d) Cambium

(vi) Name the additional sporopollenin bearing wall of Gymnosperm.

(vii) Endosperm formation is suppressed in

(a) Lamiaceae

(b) Orchidaceae

(c) Magnoliaceae

(d) Asteraceae

(viii) Pollen of Cyperaceae sheds in ____ stage.

(ix) The outer bark of tree is

(a) Periderm

(b) Endodermis

(c) Cortex

(d) Cork

(x) Name the Indian Botanist who invented the techniques of test tube fertilization of Angiosperm.

2. Answer the following : ***(any two)*** 4×2=8

(a) Campylotropous ovules

(b) Parthenogenesis

(c) Cleavage polyembryony

(d) Stem cell

(e) Genomic imprinting

3. Write short notes on : ***(any two)*** 6×2=12

(a) Induced Polyembryony

(b) Importance of apomixis in breeding

(c) Haploid culture and its significance

(d) Anomalous secondary growth in Amaranthus

(e) Transgenics in analysis of development

4. Write ***any two*** of the following :

(a) Write an illustrated account on embryo sac development in Angiosperm. 10

(b) Explain the mode of different types of endosperm development in angiosperms. 10

(c) Write a note on origin and development of periderm. Give a descriptive account on structure and functions of periderm. 5+5=10

(d) What is melissopalynology ? Give an account on the role of apiaries in crop productivity. How do you determine adulteration of honey ? 2+3+5=10

(e) Write about the factors that are associated with the cell rate and organogenesis in plants. 10

PART–B

(Biostatistics)

Marks : 30

1. Choose the correct answer : 1×4=4

   (i) What is the purpose of a *p*-value in hypothesis testing ?

   (a) Measure of effect size

   (b) Probability of observing the data if the null hypothesis is true

   (c) Confidence interval estimate

   (d) Type I error rate

   (ii) A researcher wants to compare the mean cholesterol levels of three different diets. Which statistical test should be used ?

   (a) Paired *t*-test

   (b) One-way ANOVA

   (c) Chi-square test

   (d) Independent samples *t*-test

   (iii) What is the purpose of randomization in experimental design ?

   (a) To eliminate bias

   (b) To ensure equal group sizes

   (c) To increase statistical power

   (d) To control for confounding variables

(iv) Which of the following is a measure of dispersion ?

(a) Median

(b) Range

(c) Mode

(d) Skewness

2. Answer ***any four*** of the following in brief : 2×4=8

(a) Degree of freedom

(b) Standard error

(c) Descriptive statistics

(d) Probability

(e) Variance

3. Answer ***any two*** of the following : 4×2=8

(a) Discuss the importance of standard deviation in analyzing data variability. How does it complement measures of central tendency in providing a comprehensive understanding of a dataset ?

(b) Define skewness and explain how it indicates the asymmetry in a probability distribution. Provide examples of positively and negatively skewed distributions.

(c) Explain the concept of a null hypothesis. Why is it essential in hypothesis testing and how is it typically formulated in statistical analyses ?

(d) Name and briefly describe *two* widely used statistical software packages. What features make them suitable for data analysis in research ?

4. Using the dataset : 8, 12, 15, 18, 21, calculate the standard deviation. Show the detailed steps involved, including the mean calculation, squared differences, variance computation, and the final derivation of the standard deviation. Explain the importance of standard deviation in measuring the dispersion of data. 10