2024

BOTANY — HONOURS

Paper : DSE-A-1 and DSE-A-2

The figures in the margin indicate full marks.

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

DSE-A-1

(Biostatistics)

Full Marks : 50

1. Answer ***any five*** questions : 2×5

   (a) What do you mean by random sampling?

   (b) State one use and one limitation of Biostatistics.

   (c) What is degree of freedom?

   (d) What is test of significance?

   (e) What is mutually exclusive event?

   (f) State the Hardy Weinberg Principle.

   (g) What do you mean by 'Bottleneck Effect'?

   (h) Compare variable and variant.

2. Answer ***any two*** questions :

   (a) What do you mean by measures of dispersion? Briefly explain the different measures of dispersion. 1+4

   (b) State the rules of probability with explanation. 5

   (c) In a human population a sample of 100 individuals for MN blood group character shows 50 MM, 20 MN and 30 NN individuals. Find out the allele frequencies of the M and N alleles. 5

   (d) Find out the Standard error from the following data set : 5

Length of pods	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
No. of pods	12	18	27	20	17	06

3. Answer ***any three*** questions :

(a) Define Central Tendency. What is frequency distribution?

Frequency distribution of height of plants is given below :

Height (in inches)	1 – 10	11 – 20	21 – 30	31 – 40	41 – 50	51 – 60
No. of plants	04	06	20	10	07	03

Calculate the mean height, variance and standard deviation. 2+2+2+2+2

(b) Define 'Goodness of fit'. In a plant breeding experiment, one yellow seeded pea plants produced 50 yellow seeds and 46 green seeds in F2. Calculate the segregating ratio and determine the χ^2 (Chi-square) value. Comment on your analysis. [probability 0.05, degree of freedom 1, table value of $\chi^2 = 3.841$] 2+2+3+3

(c) What is co-efficient of variation? Mention one merit and one demerit of standard deviation. In two different populations (Batch - I and Batch - II), the seed number per fruit is calculated.

Batch - I	10, 10, 07, 09, 07, 06, 08, 09, 07, 09
Batch - II	11, 09, 10, 11, 12, 11, 06, 07, 05, 08

Find out the co-efficient of variation and comment on observation. 2+1+1+5+1

(d) (i) Mention the factors affecting gene frequency.

(ii) A bag contains 5 white and 3 black balls. Two balls are drawn at random, one after the other without replacement. Find the probability of both the balls drawn are black. 5+5

(e) Distinguish between the following (***any four***) : 2½×4

(i) Sample and Population

(ii) Primary and Secondary data

(iii) Discrete variable and Continuous variable

(iv) Relative frequency and Cumulative frequency

(v) Null hypothesis and Alternative hypothesis

(vi) Independent and Dependent Event.

Paper : DSE-A-2

(Industrial and Environmental Microbiology)

Full Marks : 50

1. Answer ***any five*** questions : 2×5

   (a) What are the industrial uses of glutamic acid and lipase?

   (b) What is the use of penicillin acylase enzyme?

   (c) What is the difference between biochemical and biological oxygen demand?

   (d) What are the functions of vesicle and arbuscule in VAM?

   (e) Name a microbe used in industrial production of ethanol.

   (f) Write down the advantages of lyophilization.

   (g) State one use of centrifugation in industry.

   (h) What is fluidized bed reactor?

2. Answer ***any two*** questions : 5×2

   (a) Write the importance of mycorrhizal association in plant health.

   (b) Compare solid and liquid fermentation process.

   (c) Discuss about the properties of microbial indicator organisms and their uses.

3. Answer ***any three*** questions :

   (a) What is bioremediation? Discuss the different types of microbes involved in bioremediation of contaminated soil. 2+8

   (b) Discuss the fermentation conditions and process of industrial production of penicillin. Mention the various uses of penicillin. 8+2

   (c) What is enzyme immobilization? What are its main advantages and disadvantages? Discuss about the different types of enzyme immobilization used industrially with suitable examples. 2+(2+2)+4

   (d) Discuss the process of isolation of microorganisms from soil. State the different types of microorganisms that occur in soil with examples. What is aeromicrobiology? 5+4+1

   (e) What is biological nitrogen fixation? State the process of isolating a root nodulating bacteria. 2+8

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