2020

BOTANY — HONOURS

Paper : DSE-A-1

(Biostatistics)

Full Marks : 50

The figures in the margin indicate full marks.

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

1. Answer **any five** of the following :

   (a) What is frequency distribution?   2

   (b) Write two limitations of statistics.   1+1

   (c) What do you mean by discrete variables?   2

   (d) Define primary data with example.   1+1

   (e) Define null hypothesis with example.   2

   (f) Define statistical error. How it is different from mistake?   1+1

   (g) What do you mean by 'Population' and 'Sample'?   1+1

   (h) Define cumulative frequency distribution and mention one of its use.   1+1

2. Answer **any two** of the following :

   (a) What are the advantages of 'Arithmatic mean' and 'mode value'?   5

   (b) How does the standard deviation help for analysing the data in case of normal distribution? What is bimodal distribution?   4+1

   (c) Five persons A, B, C, D, E occupy seats in a row at random. What is the probability that A and B sit next to each other?   5

3. Answer **any three** of the following :

   (a) Explain why the standard deviation is regarded as superior to other measures of dispersion. What is its chief defect? The grain length of a variety in rice is given below :

Grain length in mm	9-11	12-14	15-17	18-20
No. of grains	3	5	9	3

   Calculate the mean and standard error of grain length of the variety.   3+2+2+3

Please Turn Over

(b) What do you mean by Hardy-Weinberg Equilibrium? Mention the factors affecting the equilibrium. In a study of a tribe from central Asia 26 Albino individuals are found in a total population of 6000. Albinism is recessive to normal skin colour. Calculate the expected allele frequencies and genotype frequencies if the population is in Hardy-Weinberg Equilibrium. How many of tribal individuals are estimated to be carriers of the recessive albino allele? 2+3+3+2

(c) Define coefficient of variation. What are the special uses of this measure? Find the coefficient of variation from the following and comment on that. 2+3+5

weight (gm)	110-119	120-129	130-139	140-149	150-159	160-169	170-179	180-189
Frequency	5	7	12	20	16	10	7	3

(d) Selfing of a hybrid plant, produced a population with 120 pink flowers and 88 white flowers. Explain the data with χ^2 analysis. Find out the segregation ratio and test the goodness of fit. Comment on the nature of segregation. [χ^2 table value is 3.84 for 1 degree of freedom at 0.05 probability level]. 3+4+3

(e) (i) Four cards are drawn consecutively four times from a pack of 52 cards. Find the chances of drawing an ace, a king, a queen and a jack. The cards are not replaced after each withdrawal.

(ii) What is the probability of getting a king or a club from a pack of 52 cards?

(iii) Define conditional probability. 4+4+2

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2020

BOTANY — HONOURS

Paper : DSE-A-2

(Industrial and Environmental Microbiology)

Full Marks : 50

The figures in the margin indicate full marks.

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

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

   (a) Name the different component of a continuously stirred bioreactor.

   (b) Name one non-legume symbiotic association for nitrogen fixation.

   (c) What is eutrophication?

   (d) Name one fecal and one non-fecal coliform bacteria in water sample.

   (e) What are the industrial uses of enzymes amylase and lipase?

   (f) Note down the advantages of lyophilization.

   (g) Explain the role of lichen as indicator organism.

2. Write short notes on (*any two*) :   5×2

   (a) Techniques involved in cell disruption

   (b) Production of Ethyl alcohol

   (c) Bioremediation of metal-contaminated soil.

3. Answer *any three* questions :

   (a) What is biochemical oxygen demand and why is its reduction important in waste water treatment? How do primary and secondary waste water treatment methods differ?   4+6

   (b) What is bioleaching? Comment on the bioleaching of a radioactive metal.
       Briefly describe the process of isolation of microorganisms from soil.   5+5

   (c) Discuss the fermentation conditions and process of penicillin production. What are the industrial uses of immobilized Penicillin acylase?   7+3

   (d) Name the different types of mycorrhizal association. Write a note on importance of arbuscular mycorrhizal association in plant root.   4+6

   (e) (i)   What are the roles of PSB and KSB in increasing soil fertilily?
       (ii) What are the different stages of nodule formation?
       (iii) Why *Pinus* can not grow in any type of soil?   4+4+2

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