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(20517) Roll No.....

B.Sc.(Bio-Tech.)-I Yr.

NS-3461

B.Sc.(Bio-Tech.) Examination, May 2017

Bio-Mathematics and Bio-Statistics

(B-107)

(New)

Time : Three Hours] [Maximum Marks : 50

Note : Attempt any five questions. Each question carries 10 marks.

1. (a) Define the following terms— 5

- (i) Finite set
- (ii) Proper subset
- (iii) Super set
- (iv) Universal set
- (v) Singleton set

(b) If $A = \{x \in N : x < 6\}$ 5

$$B = \{x : x^2 \leq 10, x \in Z\}$$

$$C = \{2, 4, 6, 8, 10\}$$

Find (i) $A \cap (B - C)$

(ii) $(A - B) \cup (C - B)$

P.T.O.

2. (a) Define linear function with example. 5

(b) Evaluate

$$\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{x^2 - 4} \quad 5$$

3. (a) Find the value 5

(i) $\frac{d}{dx} \left(\sqrt{x} + \frac{1}{\sqrt{x}} \right)^2$

(ii) $\frac{d}{dx} x^3 \log x$

(b) Evaluate : 5

(i) $\int \frac{\cos x}{\sin^2 x} dx$

(ii) $\int (x+1)(x+2)^2 dx$

4. (a) Find the term independent of x in the

expansion of $\left(\frac{3}{2}x^2 + \frac{1}{3x} \right)^9$ by using Bi-

nomial theorem. 5

(b) (i) Show that

$$\log 25 + 2 \log 3 - 3 \log 2 = \log \frac{225}{8}$$

(ii) Find the value 5

$\log_{10} 5$ given that

$$\log_{10} 2 = 0.3010$$

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5. (a) Write a note on the merits and demerits of the arithmetic mean. 5
- (b) Write a note on graphical representation of data. 5
6. (a) Three light bulbs are chosen at random from 15 bulbs of which 5 are defective. Find the probability that :
- (i) none of defective 5
- (ii) exactly one is defective
- (iii) at least one is defective
- (b) Three machines A, B and C produce respectively 50%, 30% and 20% of the total produce of a factory. The percentages of defective output of these machines are 3%, 4% and 5%. If an item is selected at random, find the probability that it is defective. 5
7. What is the relation between Normal and Binomial distribution. 10
- Let x be binomially distributed random variable with mean=1 and variance = 0.9 compute $P[3 \leq x \leq 5]$.

- (a) What do you understand by t-test? Describe their practical importance. 5
- (b) The following table gives the number of units of an article produced daily (for same days) by two labourers A and B.

A	48	30	38	41	38	35		
B	39	38	41	33	32	39	40	34

can these results be treated as sufficient evidence that labourer B is more stable? 5

[5% value of F at $v_1=5$, $v_2=7$ is 3.97]

Explain the Completely Randomised Design and Randomised Block Design. Give their advantages and disadvantages. 10

8. (a) Two lines of regression are given by $x+2y-5=0$ and $2x+3y-8=0$ and variance of $x=12$. Calculate the values of \bar{x} , \bar{y} , σ_y^2 and r . 5
- (b) Define z-test and its practical importance. 5