SAVITRIBAI PHULE PUNE UNIVERSITY
Progressive Education Society's
Modern College of Arts, Science and Commerce, Ganeshkhind, Pune-411016
B.Sc. Blended Program
(A degree of Savitribai Phule Pune University equivalent to the degree of University of Melbourne)
End Semester Examination: **April 2024**

Program: B.Sc. Blended Semester: I — SET: B
Program (Specific): B.Sc. Blended(Chemistry) — Course Type: Core
Class: S. Y. B. Sc. Blended — Max. Marks: 50
Name of the Course: Probability and Statistics
Course Code: MTH401 — Time: 2 ½ hrs
Credit: 3
Paper: I

Note:
1) All questions as compulsory
2) Figures to the right corner indicate full marks
3) Use of scientific calculators is allowed
4) Draw diagrams wherever necessary.
5) Use only Black or blue ink/ball/gel pens for writing.

Q1] Solve any 10 out of 12. [1M X 10 =10 M]
Select the correct option/ Objective questions

1)Relative complement of event B w.r.t. event A defined on the same sample space S is given by……

A. B'∩ A
B. A' ∩ B
C. A'UB
D. (A ∩ B)'

2)If A and B are two mutually exclusive events defined on Sample Space, then P(AUB) is equal to ……..

A. P (A) + P(B)-(P(A)*P(B))
B. P (A)*P (B)
C. P (A) +P (B)
D. 0

3) Let P(A) = 0.2, P(B) = 0.8, P(A∩B) = 0.1 then P(A ∩ B')=

A. 0.2
B. 0.6
C. 0.9
D. 0.1

4) The range of covariance for positive type of correlation is…

A. -∞ to ∞

B. 0 to ∞

C. 0 to 1

D. -∞ to 0

5) ANOVA stands for…

A. Analysis of covariance

B. Analytics of covariance

C. Analytics of variance

D. Analysis of variance

6) In regression analysis, the variable that is used for predictions….

A. the dependent variable

B. the independent variable

C. response variable

D. none of the above

7) Expected value of constant is

A. 0

B. 1

C. constant

D. None of above

8) If the mean of U [a,3] is 4 then 'a' will be…

A. 2

B. 3

C. 2.5

D. 5

9) If var (x) = 9 then var(3X) is

A. 18

B. 27

C. 9

D. 81

10) A function of sample is known as

A. Statistic

B. Level of significance

C. hypothesis

D. Parameter

11) Level of significance is the probability of

A. Rejection of null hypothesis.

B. Acceptance of null hypothesis

C. Rejection of null hypothesis when it is true.

D. Rejection of null hypothesis when it is false

12) The type of the test when H_1: $\mu \neq \mu o$ is

A. One sided test

B. Right sided test

C. Two sided test

D. Left sided test

Q2] Answer in brief any 10 out of 12. [2M x 10 = 20M]

1) Define the following:

a) Mutually exclusive events

b) Mutually exhaustive events.

2) Find out the probability that at most one head will turn out when tossing coins two times.

3) Define Conditional probability of event A given event B.

4) State Normal approximation to Binomial distribution.

5) Write a short note on a scatter diagram. Draw a scatter diagram to show perfect positive and perfect negative correlation between two variables.

6) Define Poisson distribution.

7) State Central Limit Theorem.

8) Define "Exponential Distribution".

9) Given the median=106, Mode=118. Find mean using empirical relation.

10) Define Mode and find out the mode value for the following data

1,2,2,3,3,4,1,1,0

11) Explain type I and type II errors.

12) Distinguish between population and sample.

Q3] Solve any 4 out of 6. [5M X 4=20 M]

1) i) Define Median

ii) Obtain the Median for following Frequency distribution,

classes	30-32	32-34	34-36	36-38	38-40
frequency	2	9	25	32	17

2) Obtain variance, standard deviation and Range for following data related to weight of students (in kgs): 48, 56, 32, 64, 42.

3) Find E (X) for a random variable X with p. d. f

$f(x) = 6x(1-x)$; $0 < x < 1$

$= 0$; otherwise

4) Describe a test for equality of population mean to given specified value (z test).

5) Suppose n=20, $\Sigma x=80$, $\Sigma y=40$, $\Sigma x^2=1680$, $\Sigma y^2=320$, $\Sigma xy=480$. Obtain value of correlation coefficient and comment upon it. Also find equation of Line of regression x on y.

6) Samples of two types of electric bulbs were tested for length of life (in and the following data was obtained.

	Type 1	Type 2
Sample size	8	7
Sample mean	1234	1036
Sample standard deviation	36	40

Test the claim that type I electric bulbs are superior to type II electric bulbs regarding average length of life. Use a 5% level of significance.
(critical value=1.771)