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1912N1036

Candidate's Seat No: \_\_\_\_\_

SYMSc (CA&IT) Sem.-3 Examination  
Computer Oriented Statistical Methods  
December-2025

Time : 2.30 Hours]

[Max.Marks : 70

**Question 1. Attempt any Two.**

**(7 \* 2 = 14 Marks )**

- (a) State the properties of the Normal Distribution. Define its mean and variance and mention real life situations where this distribution is applicable.
- (b) A program stores the following record of defects found in 10 software modules:  
Bugs = 6, Warnings = 3, Critical Errors = 1  
A random entry is selected. Find the probability that it is:  
(i) A Bug  
(ii) Not a Warning
- (c) A random variable  $X$  follows a binomial distribution with  $n=10$  and  $p=0.3$ .  
Find: (i)  $P(X=2)$  (ii) Mean (iii) Variance.

**Question 2. Attempt any Two.**

**(7 \* 2 = 14 Marks )**

- (a) What is a confidence interval? Explain how it helps in IT for decision making, with an example.
- (b) Define null hypothesis and alternative hypothesis. Explain Type-I and Type-II errors with simple IT-related examples.
- (c) A sample of 60 website loading times gives:  
Sample Mean = 4.2 sec, Standard Deviation = 0.9 sec  
At 5% significance level, using large sample Z-test, check whether the average loading time differs from 4 seconds.

**Question 3. Attempt any Two.**

**(7 \* 2 = 14 Marks )**

- (a) A sample of 12 observations has a mean of 52 and SD of 8.  
Using t-test at 5% level, test whether the population mean is 50.
- (b) What is a p-value? Explain its usefulness in hypothesis testing.
- (c) What is a test statistic? Explain its role in hypothesis testing.

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**Question 4. Attempt any Two.**

**(7 \* 2 = 14 Marks)**

- (a) What is Two-Way ANOVA? Explain the purpose of using two factors in analysis.
- (b) State any four properties of the Chi-Square distribution. Explain each briefly.
- (c) A survey checks association between device type and preference for e-books among 40 students:

	Prefer E-books	Don't Prefer	Total
Mobile Users	12	8	20
Laptop Users	10	10	20
Total	22	18	40

Use Chi-Square test to determine whether device type and preference are independent.

**Question 5. Attempt any Two.**

**(7 \* 2 = 14 Marks)**

- (a) Define correlation. Explain positive, negative and zero correlation with suitable examples.
- (b) The following data show weekly study hours (X) and corresponding marks (Y) of 6 IT students:

X (Hours)	4	6	8	10	12	15
Y (Marks)	40	45	48	52	55	60

- Compute: (i) Karl Pearson's correlation coefficient r
- (ii) Regression line of Y on X.

- (c) What is a Time Series? Explain any two components with examples from technology.