17. Use Chebyshev's theorem to find what percent of the values will fall between 123 and 179 for a data set with mean of 151 and standard deviation of 14.

18. Fit a Poisson distribution to the following data and calculate the theoretical frequencies.

x	0	1	2	3	4
y	123	59	14	3	1

19. 10 workers are selected at random from a large number of workers in a factory. The number of items produced by them on a certain day is found to be.

51 52 53 55 56 57 58 59 59 60

In the lights of these data, would it be appropriate to suggest that the mean of the number of items produced in the population is 58? (5% value oft for 9 d.f. is 2.26).
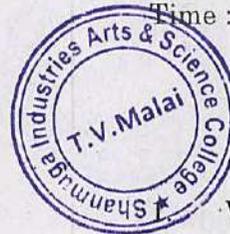
20. Perform a two way ANOVA on the data given below.

Plots of land	Treatment			
	A	B	C	D
I	38	40	41	39
II	45	42	49	36
III	40	38	42	42

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BACS42 — STATISTICAL METHODS AND THEIR APPLICATIONS – II

Time : Three hours   Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is mean by trend?

2. Explain curve fitting by least square?

3. Using Chebyshev's inequality, calculate the percentage of observations that would fall outside 3 standard deviations of the mean.

4. Define probability.

5. Define binomial distribution.

6. What is normal distribution?

7. What is null hypothesis?

8. Explain the concept of Standard error of an estimate.

9. Define Randomized Block Design.

10. Define one way classification.

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SECTION B — (5 × 5 = 25 marks)

Answer ALL questions.

11. (a) Calculate trend values by the method of least square from the data given below and estimate the sales for 2010.

Year	2003	2004	2005	2006	2007
Sales	70	74	80	86	90

Or

(b) Calculate trend value from the following data using the method of least square.

Year	2002	2003	2004	2005	2006	2007
Production	7	9	12	15	18	23

12. (a) What is conditional probability? Explain with the help of examples.

Or

(b) One card is drawn at random from a well shuffled pack of 52 cards. What is the probability that it will be (i) a diamond (ii) a queen?

13. (a) Obtain the binomial distribution for which mean is 10 and the variance is 5.

Or

(b) A book contains 100 misprints distributed randomly throughout its 100 pages. What is the probability that a page observed at random contains at least two misprints. Assume Poisson distribution.

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14. (a) A coin was tossed 400 times and the head turned up 216. Test the hypothesis that the coin is unbiased.

Or

(b) Sample of 1000 students from Bombay university was taken and their average weight was found to be 112 lbs with a standard deviation of 20 lbs. Could the mean weight of students in the population be 120 pounds?

15. (a) Three varieties A, B, C of a crop are tested in a randomized block design with four replications. The plot yield in pounds is as follows:

A6   C5   A8   B9
C8   A4   B6   C9
B7   B6   C10 A6

Analyze the experimental yield and state your conclusion.

Or

(b) Perform one way ANOVA for the data given below.

Sample I	12	16	9	14	11
Sample II	9	7	11	8	6
Sample III	14	10	13	12	16

SECTION C — (3 × 10 = 30 marks)

Answer any THREE questions.

16. Fit a parabola of the second degree to the data given below.

Year	2003	2004	2005	2006	2007
Sales	16	18	19	20	24

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