

Unit II

No. of Printed Pages : 08

Roll No.

3. (a) Fit a second degree parabola to the following data :

X	Y	
1989	352	
1990	356	
1991	357	
1992	358	
1993	360	
1994	361	
1995	361	
1996	360	
1997	359	8

- (b) A manufacturer claims that only 4% of his products supplied by him are defective. A random sample of 600 products contained 36 defective. Test the claim of the manufacturer. 7

18B1**B.Tech. EXAMINATION, May 2019**

(Second Semester)

(C-Scheme) (Main Only)

(CSE)

MATH102C

MATHEMATICS-II

*Time : 3 Hours]**[Maximum Marks : 75*

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, along with compulsory question, selecting *one* question from each Unit. All questions carry equal marks.

M-18B1**4****(3-09/17)M-18B1****P.T.O.**

Unit I

1. (a) The distribution of marks in Hindi of 60 students of 10th class is as follows :

Marks	Frequency
0-10	2
10-20	3
20-30	12
30-40	8
40-50	10
50-60	17
60-70	4
70-80	3
80-90	1

Calculate the measure of Kurtosis. **8**

- (b) Six dice are thrown 729 times. How many times do you expect at least three dice to show a five or six ? **7**

2. (a) Six coins are tossed 6400 times. Using Poisson distribution determine the approximate probability of getting six heads x times. **8**

- (b) Define correlation and regression. Solve the ranks of 12 students according to marks in Hindi and English were as follows :

Student Nos.	Hindi	English
1	5	4
2	2	3
3	1	2
4	6	7
5	8	6
6	11	9
7	12	10
8	4	5
9	3	1
10	9	11
11	7	8
12	10	12

The curiosity lies to know whether or not students who are good in Hindi are also excel in English and Vice-versa. **7**

- (b) In a factory machines A, B and C manufacture respectively 25%, 35% and 40% of the total bolt. There are 5%, 4% and 2% bolts are defective respectively. A bolt is drawn at random from the product and found defective. What is probability that it is drawn from machine B ? **8**

(Compulsory Question)

9. (a) Write 3rd moment around mean and what it is called ?
 (b) Write probability density function of the normal distribution and calculate total area under normal probability curve.
 (c) Find the straight line that best fits the following data :

$$\begin{array}{l} x : 1 \quad 2 \quad 3 \quad 4 \quad 5 \\ y : 14 \quad 27 \quad 40 \quad 5 \quad 68 \end{array}$$

 (d) Discuss multinomial distribution in brief.
 (e) The density function of a random variable X is given by :

$$f(x) = kx(2-x)$$

 Find mean deviation about mean.
5×3=15

4. (a) A random sample of 900 members has a mean 3.4 cm. Can it be reasonably regarded as a sample from a large population of mean 3.2 cm and S.D. 2.3 cms. **8**
 (b) Describe Chi-square test for goodness of fit. The following table shows the distribution of digits in numbers chosen at random from a telephone directory.

Digits	Frequency
0	1026
1	1107
2	997
3	966
4	1075
5	933
6	1107
7	972
8	964
9	853

Test whether the digits may be taken to occur equally frequently in the directory.

7

Unit III

5. (a) An urn contains 10 white and 3 black balls, while another urn contains 3 white and 4 black balls. Two balls are drawn from the first urn and put into the second urn and then a ball is drawn from the latter. What is the probability that it is white ball ? **8**
- (b) A die is tossed thrice. A success is getting 1 or 6 on a toss. Find mean and variance of the number of successes. **7**
6. (a) A box contains 5 red balls, 4 white balls and 3 blue balls. A ball is selected at random from the box, its colour is noted and then the ball is replaced. Find the probability that out of 6 balls selected in this manner, 3 are red, 2 are white and 1 is blue. **7**

M-18B1

6

- (b) Find $E(X)$, $E(X^2)$ and $E[X - \bar{X}]^2$ for the probability distribution :
- | | | | | | | |
|--------|---|---------------|---------------|---------------|---------------|----------------|
| X | : | 8 | 12 | 16 | 20 | 24 |
| $P(x)$ | : | $\frac{1}{8}$ | $\frac{1}{6}$ | $\frac{3}{8}$ | $\frac{1}{4}$ | $\frac{1}{12}$ |
- State Chebyshev's inequality. **8**

Unit IV

7. (a) A continuous random variable X having values between 0 and 4 has a density function given by $\rho(X) = \frac{1}{2} - bX$, where b is constant :
- (i) Calculate b
- (ii) Find $P(1 < X < 2)$. **8**
- (b) Discuss various properties of normal distribution function. **7**
8. (a) Let the random variables X and Y have the joint pdf :
- $$f(x, y) = \begin{cases} x + y & 0 < x < 1, \quad 0 < y < 1 \\ 0 & \text{elsewhere} \end{cases}$$
- Find covariance of X and Y . **7**

(3-09/20)M-18B1

7

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