

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III EXAMINATION – WINTER 2025****Subject Code:3130006****Date:31-12-2025****Subject Name: Probability and Statistics****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) A can hit a target 4 times in 5 shots, B, 3 times in 4 shots; and C, 2 times in 3 shots. They fire a volley (it means one shot each). Find the probability that target will be hit. **03**
- (b) Three companies A, B and C supply 30%, 50% and 20% of the notebooks to a school. Past experience shows that 8%, 5% and 10% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A? **04**
- (c) A random variable X has the following probability function **07**

$X=x$	-2	-1	0	1	2	3
$P(X=x)$	0.1	K	0.2	2K	0.3	3K

- (i) Find K (ii) Find $P(X < 2)$
- (iii) Determine the distribution function $F(x)$ of X.

- Q.2** (a) Four balls are drawn simultaneously from a bag containing 6 white, 5 black and 7 red balls. Find $E(X)$, where X denotes number of white drawn. **03**
- (b) It is known that the mean diameters of rivets produced by two firms A and B are practically the same, but the standard deviation may differ. For 22 rivets produced by firm A, the standard deviation is 2.9mm, while for 16 rivets manufactured by firm B, the standard deviation is 3.8mm. Compute the statistic you would use to test whether the products of firm A have the same variability as those of firm B. Using the value $F_{0.05}(15,21) = 2.20$ **04**
- (c) Fit a curve of the form $y = ab^x$ to the following data **07**

x :	1	2	3	4	5	6	7
y :	87	97	113	129	202	195	193

OR

- (c) Fit the second degree parabola using the least square method to the following data **07**

x :	1	2	3	4
y :	1.7	1.8	2.3	3.2

- Q.3** (a) Find the mean and median for the given data **03**

C.I.	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
f	4	6	5	10	20	22	24	6	2	1

- (b) The first four moments of a distribution about the value 5 of the variate are 2, 20, 40, and 50. Find mean and variance. **04**

- (c) Calculate the correlation coefficient between x and y using the following data **07**

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

OR

- Q.3** (a) State Chebyshev's inequality. A fair dice is tossed 120 times. Use Chebyshev's inequality to find a lower bound for the probability of getting 80 to 120 sixes. **03**

- (b) Calculate the rank correlation coefficient for given data **04**

X	85	74	85	50	65	78	74	60	74	90
Y	78	91	78	58	60	72	80	55	68	70

- (c) The equation of two regression lines obtained in a correlation analysis of 60 observations are $5x = 6y + 24$ and $1000y = 786x - 3608$. **07**

What is the correlation coefficient? Show that the ratio of coefficient of variability of x to that of y is $5/24$. What is the ratio of variance of x and y .

- Q.4** (a) A speaks truth in 75% cases and B in 80% cases. Find the probability that they are likely to contradict each other in stating the same fact. **03**

- (b) The incidence of occupational disease in an industry is such that the workmen have a 20% chance of suffering from it. What is the probability that out of 6 workmen 4 or more will suffer from disease? **04**

- (c) The following mistakes per page were observed in a book. **07**

No. of Mistake per page	0	1	2	3	4	Total
No of Pages	211	90	14	5	0	320

Fit a Poisson distribution for the given data.

OR

- Q.4** (a) Suppose on an average 1 house in 1000 in a certain district has a fire during a year. If there are 2000 houses in that district, what is the probability that exactly 5 houses will have a fire during the year? **03**

- (b) In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the parameters of the distribution. **04**

- (c) In a sample of 10 pens. If 10% of pens produced by a company are defective. Find out the probability that **07**

- (i) No pen must be defective.
- (ii) One must be defective.
- (iii) At least two must be defective.

- Q.5** (a) A sample of 100 students is taken from a large population. The mean height of the students in this sample is 160 cm. Can it be reasonably regard that, in the population, the mean height is 165 cm and the SD is 10 cm? (use 5% level of significance) **03**

- (b) Below are given the gain in weights (in lbs) of pigs fed on two diets A and B. 04

Gain in weight

Diet A : 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25

Diet B : 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

Test if the two diets differ significantly as regards their effect on increase in weight.
(using $t_{0.05}$ at 25 d. f. = 2.07)

- (c) From the following table, test the hypothesis that the flower colour is independent of flatness of leaf 07

	Flat leaves	Curled leaves	Total
White flowers	99	36	135
Red flowers	20	5	25
Total	119	41	160

If the value of χ^2 for 1 d. f at 5% level of significance is 3.841.

OR

- Q.5** (a) Two large population, there are 30 % and 25 % respectively of blue eyed people. Is this difference likely to be hidden in the sample of 1200 and 900 respectively from the two populations? (Test at 5% level of significance). 03

- (b) A certain stimulus administered to each of the 12 patients resulted in the following increase of blood pressure: 04

5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4 and 6

Can it be concluded that the stimulus will, in general be accompanied by an increase in blood pressure? (Given that for 5% level of significance t for 11 d. f is 1.796)

- (c) 12 dice were thrown 4096 times and a throw of 6 was considered as a success; the observed frequencies were given below : 07

No. of successes :	0	1	2	3	4	5	6	7 & above
Frequencies	447	1145	1181	796	380	115	24	8

Find the value of chi-square on the basis of the hypothesis that the dice were unbiased and hence show that the data are consistent with the hypothesis so far as the χ^2 – test is concerned. The value of χ^2 for 7 degrees of freedom at 5% level of significance is 14.067.

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024****Subject Code: 3130006****Date: 21-11-2024****Subject Name: Probability and Statistics****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.
5. Use of log Table/Statistical Table/Any required Table are permitted.

MARKS

- Q.1**
- (a) Define and give the example of Mutually exclusive events. **03**
- (b) One card is drawn at random from a pack of 52 cards. Find the probability of getting a king or a red card. **04**
- (c) Data on the readership of a certain magazine show that the proportion of male readers under 35 is 0.40 and that over 35 is 0.20. If the proportion of readers under 35 is 0.70, find the probability of subscribers that are female over 35 years. Also, calculate the probability that a randomly selected male subscriber is under 35 years of age. **07**
- Q.2**
- (a) Three students A, B, C are in a running race. If $P(A) = P(B) = 2P(C)$, then find the probability that B or C wins. **03**
- (b) Let X be a continuous random variable with pdf $f(x) = kx(1-x), 0 \leq x \leq 1$. Find k and determine $P(0 \leq X \leq 0.5)$. **04**
- (c) The contents of urns I, II and III are as follows: **07**
- 1 white, 2 red, and 3 black balls
 2 white, 3 red and 1 black ball, and
 3 white, 1 red and 2 black balls.
- One urn is chosen at random and two balls are drawn. They happen to be white and red. Find the probability that they came from (i) Urn I (ii) Urn II (iii) Urn III.

OR

- (c) A random variable X has the following probability distribution: **07**
- | | | | | | | |
|------------|-----|-----|-----|------|-----|------|
| X | -2 | -1 | 0 | 1 | 2 | 3 |
| $P(X = x)$ | 0.1 | k | 0.2 | $2k$ | 0.3 | $3k$ |
- (i) Find the value of k
 (ii) Find $P(x \geq 2)$
 (iii) $P(-2 < x < 2)$

- Q.3**
- (a) Let the continuous random variable X have the probability density function $f(x) = \begin{cases} \frac{1}{x^4}; & 1 < x < \infty \\ 0; & \text{otherwise} \end{cases}$ **03**
- Find distribution function $F(x)$.

- (b) A random variable X has the following distribution: 04

X	-3	-2	-1	0	1	2
$P(X = x)$	0.05	0.1	0.2	0.3	0.2	0.15

Find (i) $E(X)$ (ii) $Var(X)$.

- (c) Compute Karl Pearson's coefficient of correlation between X and Y for the following data: 07

x	2	4	5	6	8	11
y	18	12	10	8	7	5

OR

- Q.3 (a) If the two lines of regression are $2x - 5y + 30 = 0$ and $10x - 4y - 104 = 0$ which of these are lines of regression of x on y and y on x ? 03

- (b) Calculate the first four moments from the following data: 04

x	5	10	15	20	25
f	6	10	14	6	4

- (c) Obtain the line of regression of monthly sales (y) on advertisement expenditure (x) and estimate the monthly sales when the company will spend Rs. 50000 on advertisement, if the data on y and x are as follows: 07

y (in lac)	74	76	60	68	79	70	71	94
x (in thousand)	43	44	36	38	47	40	41	54

- Q.4 (a) Explain the term related to testing of hypothesis: (i) One Tailed Test 03

(ii) Two Tailed Test (iii) Critical Region.

- (b) A coin was tossed 960 times and returned heads 183 times. Test the hypothesis that the coin is unbiased. Use a 0.05 level of significance? 04

($|Z_{0.05}| = 1.96$)

- (c) In a city A, 20% of a random sample of 900 school boys has a certain slight physical defect. In another city B, 18.5% of a random sample of 1600 school boys has the same defect. Is a difference between the proportions significant at 0.05 level of significance? ($|Z_{0.05}| = 1.96$) 07

OR

- Q.4 (a) The mean breaking strength of a rope is 160 kgs. If 6 bricks (selected from different piles) have a mean breaking strength of 154.3 kgs with a standard deviation of 6.4 kgs. Test the null hypothesis $\mu = 160$ kgs. against the alternative hypothesis $\mu < 160$ kgs. at 1% level of significance. [$t_{0.01}(v = 5) = 3.365$] 03

- (b) Examine whether the two samples for which the data are given in the following table could have been drawn from populations with the same SD. 04

	Size	SD
Sample I	100	5
Sample II	200	7

($|Z_{0.05}| = 1.96$)

- (c) If X is a Poisson variate such that $P(X = 0) = P(X = 1)$, find $P(X = 0)$ and using recurrence formula, find the probabilities at $x = 1, 2, 3, 4$ and 5. 07

- Q.5 (a) Using least squares approximation method, fit a straight line $y = ax + b$ to the following data: 03

x	1	2	3	4	5
y	14	27	40	55	68

- (b) Using least squares approximation method, fit a curve $y = ae^{bx}$ to the following data: 04

x	1	5	7	9	12
y	10	15	12	15	21

- (c) Distribution of height of 1000 students is normal with mean 165 cms and standard deviation 15 cms. How many soldiers are of height (i) less than 138 cms. (ii) more than 198 cms. (iii) between 138 and 198 cms. ($P(z = 1.8) = 0.4641, P(z = 2.2) = 0.4841$) 07

OR

- Q.5** (a) In a throw of a dice the appearance of a number 4 is taken as a success. If the dice is thrown 5 times, find mean, variance and standard deviation. 03

- (b) If a random variable has a Poisson distribution such that $P(X = 1) = P(X = 2)$, find (i) the mean of distribution, (ii) $P(X = 4)$ (iii) $P(X \geq 1)$ (iv) $P(1 < X < 4)$. 04

- (c) Using least squares approximation method, fit a second-degree parabolic curve to the following data: 07

X	1	2	3	4	5
Y	5	12	26	60	97

Also, estimate y at $x = 6$.

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023****Subject Code:3130006****Date:12-01-2024****Subject Name:Probability and Statistics****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

Q.1 (a) Define and give examples of Random Experiment and Sample space. **03**

(b) For a certain model car, the probability of the air conditioner failing before the warranty expires is 0.36, the probability of alternator failing is 0.26, and the probability of both failing is 0.11. Find the probability of the air conditioner or the alternator failing before the warranty expires. **04**

(c) A microchip company has three machines that produce the chips. Machine- I produces 45% of the chips, but 5% of its chips are defective. Machine-II produces 35% of the chips and 10% of its chips are defective. Machine-III produces the rest of the chips and 2% of its chips are defective. Find the probability of: **07**

A randomly selected chip is found to be

- (i) a defective chip that has come from Machine-I,
- (ii) a non-defective chip that has come from Machine-II,
- (iii) a defective chip that has come from Machine-III.

Q.2 (a) Define Exponential Distribution and Gamma distribution. **03**

(b) The following table gives the number of aircraft accidents that occurred during the various days of the week. Find whether the accidents are uniformly distributed over the week. (Use χ^2 at 5% level of significance for 6 degree of freedom is 12.59). **04**

Days	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
No. of Accidents	14	16	8	12	11	9	14

(c) Fit a second-degree parabola for the following data: **07**

x:	0	1	2	3	4
y:	3	6	11	18	27

Estimate the value of y when x = 5.

OR

(c) Fit a relation of the form $y = ab^x$ for the following data by the method of least squares: **07**

x:	2	3	4	5	6
y:	8.3	15.4	33.1	65.2	126.4

Estimate the value of y when x = 1.

Q.3 (a) An insurance company has discovered that only 0.1% of the population is involved in a certain type of accident every year. If its 1000 policy-holders are selected at random **03**

from the population, what is the probability that not more than 2 of its clients are involved in such accident next year?

- (b) Suppose that the current measurements in a strip of wire are assumed to follow a normal distribution with a mean of 10 milliamperes and variance of 4 (milliamperes)². What is the probability that a measurement (i) exceeds 13 milliamperes, (ii) is at most 10 milliamperes, (iii) between 10 and 13 milliamperes? [Use: $P(Z \leq 1.5) = 0.9332$]. 04
- (c) Each sample of water has a 10% chance of containing a particular organic pollutant. Assume that the samples are independent with regard to the presence of the pollutant. Find the probability that in next 10 samples, (i) exactly 2, (ii) at least 4, (iii) between 2 and 7, samples contain the pollutant. 07

OR

- Q.3** (a) Form the binomial distribution for the experiment of tossing a coin three times and counting the number of heads appear. 03
- (b) In a normal distribution 31% of items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution. 04
- [Use: $P(0 < Z < 1.405) = 0.42$, and $P(0 < Z < 0.495) = 0.19$].
- (c) For the case of the thin copper wire, suppose that the number of flaws follows a Poisson distribution with mean of 2.3 flaws per millimeter. Determine the probability of (i) exactly 2 flaws in 1 millimeter of wire, (ii) at least 1 flaw in 2 millimeters of wire, (iii) between 2 and 5 flaws in 1 millimeter of wire. 07

- Q.4** (a) For the following data, which of the series A and B shows greater variation? 03

Series	Mean	Standard Deviation
A	160	10
B	60	5

- (b) In a partially, destroyed record on analysis of correlation data, only the following are legible: Variance of x, $\sigma_x^2 = 9$, regression equation $8x - 10y + 66 = 0$, $40x - 18y = 214$. Find (i) mean values of x and y, (ii) the standard deviation of y. 04
- (c) Ten competitors in a contest are ranked by three judges in the following order: 07

1 st Judge	1	6	5	10	3	2	4	9	7	8
2 nd Judge	3	5	8	4	7	10	2	1	6	9
3 rd Judge	6	4	9	8	1	2	3	10	5	7

Use the correlation coefficient to determine which pair of judges has the nearest approach.

OR

- Q.4** (a) Calculate Pearson's coefficient of skewness for the following data: 03

x:	12	17	22	27	32
f:	28	42	54	108	129

- (b) The number of messages sent per hour over a computer network has the following probability distribution: 04

X = No. of messages	10	11	12	13	14	15
P(x)	0.08	0.15	0.30	0.20	0.20	0.07

Determine the mean and standard deviation of the number of messages sent per hour.

- (c) Calculate the coefficient of correlation between x and y for the following data: 07

x:	65	66	67	67	68	69	70	72
y:	67	68	65	68	72	72	69	71

- Q.5 (a)** Define Statistical Hypothesis and types of errors occurring while testing of hypothesis. 03

- (b) To test whether a particular training improved the performance, a similar training was given to 8 participants, their scores both before and after the training are given below: 04

Score (Before):	44	40	61	52	32	44	70	41
Score (After):	53	38	69	57	46	39	73	48

Test at 5% level of significance if the training was effective in terms of performance on the test. [Use $t_{7,0.05} = 2.37$].

- (c) A manufacturer of sprinkler systems used for fire protection in office buildings claims that the true average system-activation temperature is 130°F. A sample of size $n = 9$ systems, when tested, yields a sample average activation temperature of 131.08°F. If the distribution of activation times is normal with standard deviation 1.5°F, does the data contradict the manufacturer's claim at 1% level of significance. [Use $Z_{0.01} = 2.58$.] 07

OR

- Q.5 (a)** A random sample of size 20 from a normal population has mean 40 and standard deviation of 4. Test the hypothesis that the population mean is 45. [Use $t_{0.05,19} = 2.09$.] 03

- (b) Analysis of a random sample consisting of size $m = 20$ specimens of cold-rolled steel to determine yield strengths resulted in a sample average strength of $\bar{x} = 29.8$ ksi. A second random sample of size $n = 25$ two-sided galvanized steel specimens gave a sample average strength of $\bar{y} = 34.7$ ksi. Assuming that the two yield-strength distributions are normal with $\sigma_1 = 4.0$ and $\sigma_2 = 5.0$, does the data indicate that the corresponding true average yield strengths μ_1 and μ_2 are different? Use 5% level of significance. [Use $Z_{0.05} = 1.96$.] 04

- (c) Oxide layers on semiconductor wafers are etched in a mixture of gases to achieve the proper thickness. The variability in the thickness of these oxide layers is a critical characteristic of the wafer, and low variability is desirable for subsequent processing steps. Two different mixtures of gases are being studied to determine whether one is superior in reducing the variability of the oxide thickness. Twenty wafers are etched in each gas. The sample standard deviations of oxide thickness are $s_1 = 1.96$ angstroms and $s_2 = 2.13$ angstroms, respectively. Is there any evidence to indicate that either gas is preferable? [Use $F_{0.05,(19,19)} = 2.16$.] 07

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III(NEW) EXAMINATION – WINTER 2022****Subject Code:3130006****Date:20-02-2023****Subject Name:Probability and Statistics****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Marks**
- Q.1** (a) Define random variable and continuous random variable. If X be a continuous random variable with a probability density function $f(x) = kx(1-x)$, $0 \leq x \leq 1$ find k . **03**
- (b) Define Mutually exclusive events and independent events. If A and B are independent events, where $P(A)=1/4$, $P(B)=2/3$. Find $P(A \cup B)$. **04**
- (c) State Baye's theorem. An urn I contains 3 white and 4 red balls and an urn II contains 5 white and 6 red balls. One ball is drawn at random from one of the urns and is found to be white. Find the probability that it was drawn from urn I. **07**
- Q.2** (a) Compute Spearman's rank correlation coefficient for the following data: **03**
- | | | | | | | | | | | |
|--------------------|---|----|---|---|---|---|---|---|---|----|
| Person | A | B | C | D | E | F | G | H | I | J |
| Rank in statistics | 9 | 10 | 6 | 5 | 7 | 2 | 4 | 8 | 1 | 3 |
| Rank in income | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
- (b) A manufacturer knows from experience that the resistance of resistors he produces is normal with a mean $\mu = 100$ ohms and standard deviation $\sigma = 2$ ohms. What percentage of resistors will have resistance between 98 ohms and 102 ohms? $P(0 < z < 1) = 0.3413$. **04**
- (c) In a certain factory turning out razor blades, there is a small chance of 0.002 for any blade to be defective. The blades are supplied in packets of 10, use Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10,000 packets. ($e^{-0.02} = 0.9802$) **07**
- OR**
- (c) Define exponential distribution. The average time it takes to serve a customer at a petrol pump is 6 minutes. The service time follows exponential distribution. Calculate the probability that (i) A customer will take less than 2 minutes to complete the service. (ii) A customer will take between 4 and 5 minutes to get the service. (iii) A customer will take more than 10 minutes for his service. **07**
- Q.3** (a) Obtain the correlation coefficient between x and y , when the lines of regression are: $2x-9y+6=0$, $x-2y+1=0$. **03**

- (b) Calculate the mode from the following data: 04

Age	0-6	6-12	12-18	18-24	24-30	30-36	36-42
Frequency	6	11	25	35	18	12	6

- (c) The following table gives recorded data showing the test scores made by salesmen on an intelligence test and their weekly sales: 07

Salesmen	1	2	3	4	5	6	7	8	9	10
Test scores	40	70	50	60	80	50	90	40	60	60
Sales	2.5	6.0	4.5	5.0	4.5	2.0	5.5	3.0	4.5	3.0

Calculate the regression line of sales on test scores and estimate the most probable weekly sales volume if a salesman makes a score of 70.

OR

- Q.3** (a) In a distribution, the mean=65, median =70, coefficient of skewness =-0.6. Calculate the mode and coefficient of variation. 03

- (b) Calculate the median for the following data: 04

Class(Marks group)	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	5	6	15	10	5	4	2	2

- (c) Following are the values of import of raw material and export of finished product in suitable units. 07

Export	10	11	14	14	20	22	16	12	15	13
Import	12	14	15	16	21	26	21	15	16	14

Compute the coefficient of correlation between the import values and export values.

- Q.4** (a) Explain the term related to testing of hypothesis (i) Null hypothesis (ii) Level of significance (iii) Two tailed test. 03

- (b) In sampling a large number of parts manufactured by a machine, the mean number of defectives in a sample of 20 is 2. Out of 1000 such samples, how many would be expected to contain exactly two defective parts? 04

- (c) The following table showing the number of plants having certain characters. 07

	Flat leaves	Curled leaves	Total
White flowers	267	27	294
Red flowers	757	155	912
Total	1024	182	1206

Use the χ^2 test to access the correctness of the hypothesis that the flower colour is independent of flatness of leaf at 5% level of significance.
 $\chi^2_{(0.05,1)} = 3.84$.

OR

- Q.4** (a) The mean life of a sample of 25 fluorescent light bulbs is found as 1550 hours with a standard deviation of 120 hours. The company manufacturing the bulbs claims that the average life of their bulbs is 1600 hours. Is the claim acceptance at 5% level of significance? The value of t at 5% level of significance and 24 degree of freedom is 1.711. 03

- (b) The mean life time of sample of 100 fluorescent light bulbs produced by a company is computed to be 1570 hours with a standard deviation of 120 hours. The company claims that the average life of the bulbs produced by it is 1600 hours. Using the level of significance of 0.05, is the claim acceptable? ($Z_{0.05} = \pm 1.96$). 04

- (c) State Chebyshev's inequality. A fair dice is tossed 120 times. Use Chebyshev's inequality to find a lower bound for the probability of getting 80 to 120 sixes. **07**

- Q.5 (a)** Fit the line $y = a + bx$ for the following data: **03**

x	0	5	10	15	20	25
y	12	15	17	22	24	30

- (b) Fit the curve $y = ax^b$ to the following data. **04**

x	61	26	7	2.6
y	350	400	500	600

- (c) Define Gamma distribution. Given a Gamma random variable X with $r = 3$ and $\lambda = 2$. Compute $E(X)$, $Var(X)$ and $P(X \leq 1.5 \text{ years})$. **07**

OR

- Q.5 (a)** Define Skewness. The first four central moments of a distribution are 0, 2.5, 0.7 and 18.75. Compute Skewness and Kurtosis. **03**

- (b) Two random samples gave the following data: **04**

	Size	Mean	Variance
Sample I	8	9.6	1.2
Sample II	11	16.5	2.5

Can we conclude that the two samples have been drawn from the same normal population? $F_{0.05}(10,7)=3.64$.

- (C) Fit a parabola $y = a + bx + cx^2$ for the following data: **07**

x	1	2	3	4	5
y	5	12	26	60	97

Also, estimate y at x=6.