

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER VI – EXAMINATION – SUMMER 2015**

**Subject Code: 153702****Date: 05/05/2015****Subject Name: Applied Statistics & Environmental Instrumentation****Time: 02:30pm - 05:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Write down detailed note on microscopy and explain electron microscopy in detail. **07**  
**(b)** Write a short note on Ultra Performance Liquid chromatography. Differentiate between UPLC and HPLC. **07**

- Q.2 (a)** Explain atomic adsorption spectroscopy in detail with diagram. **07**  
**(b)** The expenditure of 1000 families is given below: **07**

Expenditure	40-59	60-79	80-99	100-119	120-139
No. of families	50	-	503	-	50

The mean and median of the distribution are both 87.50. Calculate the missing frequencies.

**OR**

- (b)** Find the missing frequency if the arithmetic mean is 33. Also find out median and mode of the series: **07**

Loss of sales	0-10	10-20	20-30	30-40	40-50	50-60
No. of sellers	10	15	30	-	25	20

- Q.3 (a)** Write a short note on Gas chromatograph. Explain the merits and demerits of the gas chromatograph. **07**  
**(b)** In a test series involving Australia, the Waugh brothers made the following scores: **07**

Name	1 <sup>st</sup> test		2 <sup>nd</sup> test		3 <sup>rd</sup> test	
	1 <sup>st</sup> Innings	2 <sup>nd</sup> Innings	1 <sup>st</sup> Innings	2 <sup>nd</sup> Innings	1 <sup>st</sup> Innings	2 <sup>nd</sup> Innings
Steve Waugh	34	7	26	201	56	12
Mark Waugh	67	35	42	39	47	51

Identify better batsman and the more consistence batsman in that series.

**OR**

- Q.3 (a)** Discuss the principle and working of flame photometer. **07**  
**(b)** Calculate the mean, standard deviation and variance for the following data: **07**

No of defects per item	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Frequency	18	32	50	75	125	150	100	90	80	50

- Q.4 (a)** Table below gives the age and blood pressure of 10 women **07**

Age	56	42	36	47	49	42	60	72	63	65
Blood Pressure	147	125	118	128	145	140	155	160	149	150

- (i) Determine the regression equation of y on x.
- (ii) Estimate the blood pressure of woman whose age is 45 year.

- (b) List out the difference between Raman Spectroscopy and Infrared Spectroscopy. Also state Lambert's and Beer's law. **07**

**OR**

- Q.4 (a)** By using the following data, find out the two lines of regression: **07**  
 $\sum X=250$ ,  $\sum Y=300$ ,  $\sum XY=7900$ ,  $\sum X^2=6500$ ,  $\sum Y^2=10000$  and  $N=10$ .

- (b) Explain different components and working of UV-visible spectrophotometer with neat sketch. **07**

- Q.5 (a)** Assume the mean height of soldiers to be 68.22 inches with a variance of 10.8 inches. **07**  
 How many soldiers in a regiment of 1000 would you expect to (i) 6 ft tall; (ii) below 5.5 ft tall if the heights of soldiers are assumed to be normally distributed.  
 ( $P(Z=0.6756)=0.2501$ ;  $P(Z=1.15)=0.3749$ )

- (b) A person plays a game of throwing a die under the condition that he could get as many rupees as the number of points on the uppermost face. Find the expectation and variance of his winnings. **07**

**OR**

- Q.5 (a)** The following table gives the number of days in a 100 day period, during which accidents occurred in city: **07**

No. of Accidents	0	1	2	3	4
No. of days	40	35	15	6	4

Fit a Poisson distribution to the data.

- (b) In a bag there are 5 white and 3 black balls. What is the probability that if they are drawn out one after another, the first ball will be a white, second black, the third white, and again the fourth a black one? **07**

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