VPM's
DR VN BRIMS, Thane
Programme: PGDM (2016-18)
First Trimester Examination October 2016

Subject	**Quantitative Techniques - I**		
Roll No.		**Marks**	**60 Marks**
Total No. of Questions	**7**	**Duration**	**3 Hours**
Total No. of printed pages		**Date**	**6.10.2016**

Note: Q1 is compulsory and solve any FOUR from the remaining SIX questions.

Q1) 20 Marks (Compulsory)

1. Find the missing frequencies in the following distribution, for which it is known that median = 48.25 & mode = 44 **(10 Marks)**

Class Intervals	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	Total
Freq.	3	7	?	?	?	20	16	4	150

2. **Answer following questions: (10 Marks)**
   1. The range of a data set is defined as the difference between the mean and the median. Answer true or false.
   2. Standard deviation is the square of the variance. Answer true or false.
   3. The time between successive arrivals of customers, Y, at a department store is an example of a continuous random variable. Answer true or false
   4. Sampling error occurs when the sample is not representative of the population. Answer true or false
   5. The standard error of the estimate is computed by dividing SSE by the degrees of freedom of error and then taking the square root. Answer true or false
   6. In the distribution of a set of grouped data, a running total of the frequencies through the classes is given by the _____.
      a) relative frequency
      b) cumulative frequency
      c) class midpoint
      d) median class frequency
      e) modal class frequency
   7. If the standard deviation of a population is 9, the population variance is _____.
      a) 3
      b) 9
      c) 21
      d) 27
      e) 81
   8. If the occurrence of one event precludes the occurrence of another other event, then the two events are _____.
      a) collectively exhaustive
      b) non interacting
      c) mutually exclusive
      d) independent
      e) joint events
   9. A graphical mechanism for examining the relationship between two numerical variables is called a _____.
      a) cause-and-effect diagram
      b) pie chart
      c) stem and leaf plot
      d) scatter plot
      e) dot plot
   10. In the regression equation Y_c = a+bX, the variable Y is the independent variable. Answer true or false

Attempt Any FOUR from the Remaining SIX Questions

Q2) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) Obtain the 'less than' & 'More than' cumulative frequencies from the following information

Salary (thousand Rs.)	40-50	50-60	60-70	70-80	80-90	90-100	100-110
No. of graduates freq.	6	18	30	24	18	15	9

b) Salary distribution of supervisors in a company is given below. The total salary of the three supervisors in the group '2800 & over' is known to be equal to Rs. 12600. You are required to compute the mean weekly salary of supervisors.

Salary in Rupees	No. of supervisors
2400-2450	3
2450-2500	8
2500-2600	12
2600-2700	10
2700-2800	14
2800 & over	3

c) A sample of 400 bulbs was put to test to find out their burning life. The results of the test are given below:

Life (in hours)	No. of bulbs
1600-1800	14
1800-2000	46
2000-2200	60
2200-2400	73
2400-2600	68
2600-2800	62
2800-3000	48
3000-3200	23
3200-3400	6

Find from the given information

i. Mean life of the bulbs
ii. Standard deviation

Q3) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) From the data given below, calculate the probability that an employee chosen randomly is a female or a rank 2 employee

	Rank			
Gender	**R1**	**R2**	**R3**	**Total**
Male	30	80	90	200
Female	20	40	40	100
Total	50	120	130	300

b) A variable x is normally distributed with $\mu = 120$ & $\sigma = 10$. Find

i. $P(x>135)$
ii. $P(110<x<135)$

c) Find the Karl Pearson's co-efficient of correlation between age & playing habits of the following students & also comment on the results..

Age of players	16	17	18	19	20	21	22
No. of students	2500	2000	1800	1500	1200	1000	400
Regular players	2250	1700	1260	900	480	180	60

Q4) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) Calculate mean deviation about i) mean & ii) median for distribution.

Marks	No. of Students
20-30	4
30-40	12
40-50	18
50-60	28
60-70	19
70-80	14
80-90	5

b) Calculate the two regression coefficients & comment on the results.

Test Scores X	54	60	63	66	81	81	84	87	87	87

Sales Y	26	30	32	31	31	34	38	33	39	36

c) Calculate 4-monthly moving averages as forecasts for following data:

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Demand	280	288	266	295	302	310	303	328	309	315	320	332	310	308	320

Q5) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) A consumer's group is suspicious about the weight of certain brand of cereal for which the boxes are labeled as containing 12 ounces. A random sample of 50 boxes yields an average weight of 11.6 ounces with a standard deviation of 1.68 ounces. Test the hypothesis that population mean weight is 12 ounces, at the 0.05 level of significance. Calculate the p-value.

b) *Develop a stem-and-leaf plot for the data.*

25	31	20	32	13
14	43	02	57	23
36	32	33	32	44
32	52	44	51	45

c) A pack contains 30 tickets numbered consecutively from 1 to 30. A ticket is chosen at random from this. Find the chance that the number on this would be

i. A multiple of 6 or 7
ii. A multiple of 3 or 5

Q6) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) Calculation of median & Quartiles

Marks	f	cf
10-20	62	62
20-30	128	190
30-40	240	430
40-50	95	525
50-60	75	600

b) BSES uses a sample survey to determine the average consumption per month. They survey 200 households & find that the average electricity consumed is 9.5 units the standard deviation is 2.1. Set up the confidence limits on the basis of 95% level of confidence as well as 99% level of confidence.

Level of confidence	90	95	98	99
$Z_{\frac{\alpha}{2}}$	1.64	1.96	2.33	2.58

c) Given the following data:

X	9	11	9	14	14	13	16	18
Y	12	18	18	20	20	22	24	26

i. Obtain the two regression equations
ii. Obtain the value of the coefficient of correlation

Q7) ***Any two from (a) or (b) or (c) ———— (5x2) = 10 Marks***

a) Find the probability that

i. The sum of digits on a pair of dice is equal to 8.
ii. The product of digits obtained on tossing of two balanced dice is a perfect square.

d) For following distribution compute inter-quartile range

Marks	No. of Students
20-30	4
30-40	12
40-50	18
50-60	28
60-70	19
70-80	14
80-90	5

e) Calculate the three coefficient of multiple correlation using the following coefficient as inputs: r_{12} =0.70, r_{13} =0.61, r_{23} = 0.40