

**SVKM's NMIMS**  
**School of Distance Learning**

Programme : PGDBM / PGDITM / PGDSCM

Academic year : 2011 – 2012  
Subject: Business Statistics

Semester : III  
Course New  
Marks 70  
Time: 3.00 p.m. to 6.00 p.m.

Date: 27.12.2011

**Instructions:**

Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer book, which is provided for their use.

NB:

1. All 4 questions are compulsory.
2. Candidates should attempt questions as per the internal options available.
3. Use of non programmable Calculator, Statistical Tables (Area under the Normal curve) permissible.

Q.1. Attempt any two of the following (10 Marks)

(a). Calculate mean, median and mode for the following data:

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of Students	25	20	20	14	7	2	1

(b). Determine the interquartile range and percentile range of the following frequency distributions

Age in Years	11-13	13-15	15-17	17-19	19-21	21-23	23-25
No. of Students	8	10	15	20	12	11	4

(c). Calculate Standard deviation of the following series

Weekly Wages	No. of Workers	Weekly Wages	No. of Workers
100-105	200	130-135	410
105-110	210	135-140	320
110-115	230	140-145	280
115-120	320	145-150	210
120-125	350	150-155	160
125-130	520	155-160	90

(d). Calculate Karl Pearson's coefficient of Skewness from the following data

Weight (in Kg)	1	2	3	4	5	6	7
No. of Fruits	10	18	30	25	12	3	2

Q.2. Attempt any two of the following

(10 Marks)

- (a) What are the six desirable qualities of good measures of central tendency?
- (b) Explain the measures of Skewness (i) based on mean, median and mode (ii) based on Quartiles or Percentiles
- (c) Explain Relationship between Correlation Coefficient and Regression Coefficient
- (d) Explain Axiomatic approach of probability
- (e) What are the important properties of Normal probability distributions.

Q.3. Attempt any three of the following

(30 Marks)

- (a) A group of 3 men and 3 ladies is to be selected from a group of 5 men and 6 ladies. What is the probability that a particular man will not be in the group and particular lady will be in the group.
- (b) From the prices of shares of X and Y given below using Coefficient of variation, state which share price is more stable in value.

X	55	54	52	53	56	58	52	50	51	49
Y	108	107	105	105	106	107	104	103	104	101

- (c) Pearson and Lee obtained the following results in a study of about 1000 families. Average height of husband is 68 inches with standard deviation of 2.7 inches. Average height of wife is 63 inches with a standard deviation of 2.5 inches. If the coefficient of correlation is 0.25, predict the height of a wife when the height of her husband is
  - (a) 68 inches
  - (b) 72 inches
  - (c) 64 inches
- (d) In a certain city 20% of persons are vegetarians. If 5 persons from the city are chosen at random, find the probability that
  - (i) None of them is vegetarian
  - (ii) At least one is vegetarian
- (e) The weekly expenditure of a family in a town follows a normal distribution with an average expenditure in a week is Rs. 800/- with a standard deviation of Rs. 100/- Find (i) What is the probability that a family selected at random from this town will have the expenditure between Rs. 800 and Rs. 1000
  - (ii) What percentage of families will have their expenditures between Rs.600 and Rs. 900?
  - (iii) What percentage of families will have their expenditures below Rs. 650?

Q.4. Case Study

(20 Marks)

Flora Electrical Appliance Company Ltd.

M/s Flora Electrical Appliance Company Ltd., is one of the eminent Electrical goods manufacturing and selling company of international repute. The company was due to Mr. Mahesh Choudhary, the only child of the promoters Mr. Mukesh and Mrs. Madhavi, who were committed and enthusiast in the field of Electrical Engineering. The Company is in the business of manufacturing and marketing various sophisticated electrical home appliance and has gained international recognition for its quality products in a very short span of time. The company is now planning to embark on manufacturing and marketing a special brand of washing machines

of international standard. The company has herded in on two well known makes of the washing machines manufacturing namely "Alpha -2" and "Beta-3". Mr. Mahesh Choudhary, after completing his graduation in electrical engineering and toping with an MBA from a prestigious Management college has joined his mother Ms. Madhavi, who is the M.D. of the company in taking key investment decisions for the company. His first important assignment is to help his mother in deciding on the make of the "Washing Machine Manufacturing".

The relevant details and features of these makes are given below.

(A) Machine make : Alpha – 2

(1) Production capacity : 2000 machines per month

(2) If set at the 8 kg as standard average weight of the proceed = 8 kg with a variance 1.52kg

(Weight of washing machine is assumed to be Normal distribution)

(B) Machine make : Beta -3

Production capacity: 2500 machines per month

If set at 8.5kg as standard, average weight of the proceed =8.5kg with a variance of 1.25kg

(Assume that the weight is normally distributed)

- Given 1) The total fixed investment for both the makes is the same and recurring variable expenses are in proportion to the respective production capacities.  
2) The machines are to run at their respective full capacities.  
3) The cost of manufacture is Rs. 8500 per washing machine produced for both the Makes  
4) The selling price is Rs. 10,000 per approved good quality machines.  
5) As per the international standards approved, quality washing machines need to have weight more than 8kg but should not exceed 10kg  
6) Washing machines weighing more than 10kg can be re-worked to confirm the quality standard and sold as quality machines but the re-working, not eroding the manufacturing machines capacity entails Rs. 500 per machine as an additional cost.  
7) The non standard unweighted machines are totally scrapped and have zero salvage value.

The management of Flora Electrical Appliance Ltd., seized with the problem of choosing the machine which statistically is expected to yield more profit every month.

How would Mr. Mahesh Choudhary armed with an MBA from a Coveted Management Institution would analyze the problem and come out with appropriate answer to help his mother Ms. Madhavi, the Managing Director of Flora Electrical Appliance Company Ltd. to take the right decision.

Required: Assume yourself in the shoes of Mr. Mahesh Chaudhary, and analyse the problem and arrive at an answer for more profitable make of the machine. The answer should be backed with some logic and statistical justifications. You are required not only to indicate the right choice of the make but also required to calculate excess profit expected to be generated per month by the chosen make over the one not chosen

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