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MS-104/CP-1004

Quantitative Techniques in Management

प्रबन्धमेंपरिमाणात्मकतकनीकें

Master of Business Administration/Diploma in Management

(MBA-10/12/13/16/17/DIM-10/16/17)

1st Semester, Examination June 2022

Time: 2 Hours Max. Marks: 80

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section – A

(Long Answer – type questions)

Note: Section 'A' contains Five (05) long-answer-type questions of Twenty (20) marks each. Learners are required to answer any two (02) questions only.

[2 x 20 = 40]

P.T.O.

Q.1. The following table gives the distribution of items of production and also the relatively defective items among them, according to size groups. Find the correlation coefficient between size and defect in quality.

Size-group :	15-16	16-17	17-18	18-19	19-20	20-21
No. of items:	200	270	340	360	400	300
No. of defective items:	150	162	170	180	180	114

Q.2. Self-help canteen employs one cashier at its counter, 8 customers arrive every 10 minutes on an average. The cashier can serve at the rate of one customer per minute. Assume Poisson's distribution for arrival and exponential distribution for service patterns. Determine

(a) Average number of customers in the system.

(b) Average queue length

(c) Average time a customer spends in the system.

(d) Average waiting time of each customer.

Q.3. The investment staff of PNB Bank is considering four investment proposals for clients, shares, bonds, real estate and saving certificates, these investments will be held for one year. The past data regarding the four proposals are given below:

P.T.O.

Shares : There is 25% chance that shares will decline by 10%, 30% chance that they will remain stable and 45% chance that they will increase in value by 15%. Also the shares under consideration do not pay any dividends.

Bonds: These bonds stand a 40% chance of increase in value by 5% and 60% chance of remaining stable and they yield 12%.

Real Estate: This proposal has a 20% chance of increasing 30% in value, a 25% chance of increasing 20% in value a 40% chance of increasing 10% in value, 10% chance of remaining stable and a 5% chance of loosing 5% of its value.

Saving Certificates: These certificates will yield 8.5 with certainty.

(Use a decision tree to structure the alternatives available to the investment staff, and using the expected value criteria choose the alternative with the highest expected value.)

Q.4. Two salesman A and B are working in a certain district. From a sample survey conducted by the Head Office, the following results were obtained.

	Salesman	
	A	B
No. of samples :	20	18
Average Sales (₹in thousand) :	170	205
Standard deviation (₹in thousand) :	20	25

P.T.O.

State whether there is any significant difference in the average sales between the two salesman.

Q.5. How can an unbalanced transportation problem be balanced? How do you interpret the optimal solution of an unbalanced transportation problem?

Section – B

(Short-answer-type questions)

Note: Section 'B' contains Eight (08) short-answer-type questions of Ten (10) marks each. Learners are required to answer any Four (04) questions only.

[4 x 10 = 40]

Q.1. What assumptions must be met for a binomial distribution to be applied to a real life situation?

Q.2. What are the chief properties of normal distribution? Describe briefly the importance of normal distribution in statistical analysis.

Q.3. Solve graphically.
Maximize $z = 5x_1 + 4x_2$

P.T.O.

Subject to : $4x_1 + 4x_2 \leq 40$

$2x_1 + 3x_2 \leq 90$

$x_1, x_2 \geq 0$

Q.4. An HR manager is interested to determine whether absenteeism is greater on one day of the week them on another. His records for the past year show the following sample distribution:

Day of the week:	Mon.	Tue.	Wed.	Thur.	Friday
No of absentees:	66	56	54	48	75

Test whether the absence is uniformly distributed over the week.

Q.5. Explain step by step process used in solving LPP using simplex method.

Q.6. Write a method of solving an assignment problem. Illustrate with an example.

Q.7. In a hospital 480 female and 520 males babies were born in a week. Do these figures confirm the hypathesis that males and females are born in equal number? Elucidate.

P.T.O.

Q.8. A bag contains 5 white and 3 black balls. Two balls are drawn at random one after the other without replacement. Find the probability that both balls drawn are black.
