**NAME: MUHAMMAD KARIM**

**I: D: 16942**

**TEACHER: SIR ZUHAIB**

**SUBJECT: QUANTIATIVE AND QUALITATIVE TECHNIQUE**

**Q1 (A)**

**NOMINAL**: Nominal stand for “name” of category

Number are used simply as label for group or classes, and this is use for qualitative rather than quantitative data

Nominal scale is the least powerful level of measurement and nominal scale provide convenient way of keeping track of people object and event.

 In numerical scale of measurement we assign number to objects where different number indicate different objects.

The number have no real meaning other than differentially between objects.

**EXAMPLE:** Baseball uniform number.

The number provide no insight in to the players position it simply differentiate between players so if someone has the number 23 on their back and someone has number 25 is better ,has a higher average hits more home runs or anything it just mean they are not the same players as 23,it simply differentiate the objects

Eye color (blue, green, brown, etc.)

**ORDINAL**: In this data we assign number to object(like nominal) but here number also have meaning order. From order scales the order of the values is what’s the important and significant, but the difference between each one is not really known

We can measure ordinal scales of non-numeric like satisfaction happiness, discomfort etc.

**EXAMPLE**: place finished in race Ist ,2nd,3rd,and so one, so the first place person, did better that second did better from third and so on and that number they assigned one ,two, or three, indicate how they finished in a race so it indicate order.

Other example: Heat (low, medium, high)

But we don’t know how much is better and it means we cannot quantify.

Ordinal is easy to remember because sound like order and that’s the key to remember with ordinal scale it is the order that matters but that’s all you really get from these

And ordinal data can be order according to their relative size or quality e.g four product rank by the consumer may be raked as 1,2,3 and where 4 is the best and 3 is worst..

**INTERVAL SCALE OF MEASURMENT**”In this measurement scale the value of zero is assigned arbitrarily therefor we cannot take ratio of two measurement.

Number have order like ordinal but there are also equal interval between adjacent categories. And we can take ratios and intervals.

Interval data provides more powerful measurement than original scale.

Internal scale also incorporate the concepts of equality of interval.

**EXAMPLE**’ if we take temperature in degree Fahrenheit the difference b/w 78 degree and 79 of that one degree difference is the same as the difference b/w 45 degree and 46 degrees one degree difference one again so anywhere long that scale up and down the Fahrenheit scale that one degree difference means the thing all up and down that scale ok that is classis interval scale right there with those difference are meaning and we will control this with ordinal in just a few moments.

Time we can measure time of day which is internal scale

We cannot say 10”00 am is twice as long as 5’00 am we can say that internal b/w 0”00 midnight and 10”00 which duration of 10 hours is twice as long as the internal between 000 am and 5.00 am which is duration of 5 hours this is because 0.00 does not mean absence of any time/

**RATIO SCALE OF MEASURMENT:”** if two measurement are in ratio scale then we take ratios of those measurement

The zero in this scale is a an absolute zero

Ratio scale represent the actual amount of variable

Measurement of physics dimension such as weight, height, distance are example.

All statistical technique are usable with ratios scale and all manipulation that one can carry out with real number can also be carried out with ratios scale values

Multiplication and division can be used with this scale but not with other scales

Hence nominal scale is the least precise type of scale and ratios scale is the most precise type of scale

**EXAMPLE.** Money is measured in ratios scale

**QUALITATIVE VARIABLE**: Any variable that can’t be counted or we can say that we cannot give the numerical value, nominal and ordinal variable fall under this umbrella term. And this qualitative which we can feel the presence or absence of a particular phenomenon.

Qualitative basically is descriptive data based on observation.

The key difference of quantitative use number and qualitative use words,

Qualitative can use numerical codes to facilitate data collection and prepare data for entry in to computer data base e.g. 1 denote male and 2 denote female

Statistical analysis to summarize qualitative data is limited we can summarize the qualitative data by drawing pie chart bar diagram

But if you try to arithmetic operation on numerical codes provided to qualitative data we will not get meaningful result on addition, multiplication, division, subtraction

Qualitative usually involve the 5 senses, see, feel, taste, hear, smell,

**EXAMPLE:** Black this is color it doesn’t have any number this visual we seeing color we are describing it using it words so this would fall under the category of qualitative variable.

**EXAMPLE:** honesty, beauty, race, like and dislike, pass or failed.

**QUANTITATIVE VARIABLE**: A category that include any variable that can be counted or we can give the numerical value it is called quantitative variable.

The amount which the researcher collected the quantitative data the number we record represent real amount that can be added or subtracted, divided

Quantitative data like information of weight, height, IQ number of children, and life time of an electric bill etc.

Quantitative variable are highly clear and specific for the survey conducted,

Quantitative data is normally accurate and Hench highly reliable.it is easily communicate and easily elaborate using charts, table, graphs etc.

Something we can measure with tool or scale or count. We can compare these values on number line, 2 pounds is less than 4 pounds,

We can take mathematical average of these value can be used in computation

**REGRESSION:** Regression is concerned with estimating the value dependent variable corresponding to known value of independent variable.it can be utilized to assess the strength of the relationship between variable and for modeling the future relationship between them

In simply we find out that the one variable we know that and we want to find the other variable this process we find another variable is called regression

In the regression one value of variable I know so what will be other corresponding value this will find from regression

Suppose we have sale and advertisement if the data multiple data have given to us

|  |  |
| --- | --- |
| Sale (x) | Advertisement(y) |
| 5 | 7 |
| 10 | 20 |
| Nil | 22 |

For the sale of 5lack we advertised 7lack and for sale of 10lack we advertised 20lack if we are going to do advertisement of 22 lack what will be the sale value here we estimate or find that what will be the value of advertisement sale is dependent variable because sale is dependent on advertisement so this is called regression analysis

So we can forecasting the future value or missing value so basically it is prediction techniques so we can it is forecasting technique so we use the regression analysis so we can predict two value from this regression analysis first we know the variable in model we only study the variable not constant

**CORRELATION:**

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. The magnitude of the correlation coefficient ranges between +1 and -1 in comparison to the intensity of the comparison. A value of ± 1 reveals a complete degree of similarity between the two variables. As the value of the coefficient of correlation goes to 0, the relation between the two variables will be weaker. The sign of the coefficient indicates the direction of the relationship; a + sign indicates a positive relationship, and a – sign indicates negative relationship. In statistics we usually measure four types of correlations: Pearson correlation, category correlation for Kendall, Spearman correlation, and the Point-Biserial correlation. The app below lets you make a connection really quickly

 (e.g., height, weight).

**Q2**

**QUANTITATIVE TECHNIQUES:** There are many techniques that manager use to make a best decision related to the determine of the problem.so quantity techniques able to manager to take decision objectively and efficiently. The manager use the approach of scientific and statistical approach to take best decision. The manager use the past data to determine and take decision that must be valuable in the future. The manager selected from the alternative and the right one is important because every decision has consequences.

**METHOHDOLOGY OF QUANTITATIVE TECHNIQUES:**

This methodology is use for the purpose of solving the problem, there are following step use for to identity the problem

**FORMULATING THE PROBLEM**: In this point the researcher or problem finder must understand the problem first. The researcher formulates the question that the researcher primarily focuses on the question because there are other component that the researcher will recognize because the researcher understands the problem's weaknessThe analysis is clear and concise regarding the problem. The observer is thus unlikely to cope with the entire topic and so the analyst choosing a few problems is likely to result in the greater gain. There are several categories of the question identified by the analyst in the following

**STANDARD PROBLEM: These are well-structured problems, characterized by routing, repeated decisions using specific decision-making techniques in their solution strategy**.

And specific problem are unique and non-recurrent in nature and therefore ill structured.

A researcher problem they use questions that are used to explain it.

Example:

 PROBLEM: lack of customer at a hotel:

Research question: Are customer not satisfied from the service of hotel.

**DEFINNING THE DECISION VARIABLES AND CONSTRAINTS**: in the second point the problem situation to find out the key decision related variable is very important.so the researcher identify these variables and helps to develop model. A manufacturer producing product of A,B,and C of using two machine I, and II.product A take 2 minutes on machine I 5 minutes on machine Viand product B take 1minut on machine I and 3 minutes on machine II and product C take 4 minutes on machine I and 6 minutes on machine B and total available time for machine I is 100 hours and machine ii total hours 120hours.each unit of product A yield profit Rs3 and B Yield profit 4 and C yield profit Rs 5 so the what should be the level of production of product A,B and c that should be manufactured by the company to maximize the profit;

The researcher take decision of variables objective and limitation find out from the problem

The company manufactured three product A,B and C let A be x1,B X2 and C X3 and these are three decision variable for the problem and the objective is to maximize the profit. And to know how many units of x1, X2 and x3 to be manufactured and there are two machine 1 and II total hours are 100 and 120 hours and the machine hours is the resources constraint and machine cannot use more than 100 and 120 hours

To summarize

Key decision: how many units of x1, x2 and x3 are to be produced?

Decision variables: x1, x2 and x3

Objective: to increase the profit

Constraint: machine hours

**DEVELOPING A SUITABLE MODEL:** At this stage the question appears in the form of a mathematical method displaying the equations and calculation that represent the question, e.g. the benefit will be obtained by subtracting the expense from the sale price and calculating the amount of units sold.eg sales price 100 and the expense is 60 in the method of a mathematical type.

TP= (SP-CP) X

TP=(100-60)X

TP=40X

Now the above mathematically equation show the real situation which can easily understand in the form of model. And the model can be used to increase the profit and decrease the cost

**ACQUIRING THE INPUT DATA**: The researcher must take the data of input accurately and this is very important because if the data are not accurate or not in quality the result would not be accurately achieved if the model is accurate its shows the perfect representation of reality. Improper data will result in misleading results.so one thing accurate data collecting one of the most difficult steps in performing quantitative analysis

Obtaining correct and relevant data is a difficult exercises

**SOLVING OF MODEL**: A solution to a model implies determination of a specific set of decision variable that would yield a desired level of output,

And desired level of output is determined by the principle of choice adopted and represent the level which optimizes

Feasible solution: A solution which satisfies all the constraint of the problem,

Infeasible solution: solution which does not satisfied the constraint

Optimal solution: a feasible solution that optimizes

Model validation: Model validation is defined within regulatory guidance as the set of processes and activities intended to verify that models are performing as expected in line with their design objective and business uses, it

Means this validation shows the come test of model to confirm that it provides an accurate representation of the real problem. This tell about the how good the solution are and we can point out the inaccuracy and correct until to model to fit.

It also identifies potential limitation and assumption and assesses their possible impact

Model validation consist of four element which should be considered

**IMPLEMENTATION THE RESULTS**: Implementation is the process of incorporating the solution in the organization

No specific prescription can be provided which would guarantee the universal acceptance and application of the remedy received. Unless the approach becomes desirable and more efficient, if the boss rejects the proposed plan, then the work would have to be carefully tracked until remedy has been introduced.

**Q3 (A)**

**MEASURE OF VARIABILITY:**

**RANGE**: The range is the different between the largest and smallest observations

RANGE=Maximum-Minimum

Sample of 4 observations: 45,64,68,51

 or in other words the maximum minus the minimum consider this sample of four observation this first value we will call X1 second one x2 third one x3 and four one x4 and rang is maximum value is the 68 minus the minimum value 45 which work out to 23 and the range it is very easy to calculate and interpret but it’s not great measure of variability the rang doesn’t tell us anything about the spread of the value between maximum and the minimum.

**STANDARD DEVIATION**: The standard deviation is the square root of the variance: and standard deviation is a statistical measure that represent the rate of divergence from the mean in data set and is used a lot in trading. A small standard deviation means that the values appear to come similar to the fixed mean while a large standard deviation implies that the values are distributed across a larger spectrum.

**VARIANCE:** The variance is the mean average of the square differences. First, measure the difference between every point and the mean to evaluate the variance; then, square and combine the effect.

**Q3 (B) RELATIVE STANDING:**

Following are the points that falls in this category

1. Z-Score:

A Z-score is a numerical measurement that describes a value's relationship to the mean of a group of values. Z-score is measured in terms of [standard deviations](https://www.investopedia.com/terms/s/standarddeviation.asp) from the mean. If a Z-score is 0, it indicates that the data point's score is identical to the mean score. A Z-score of 1.0 would indicate a value that is one standard deviation from the mean. Z-scores may be positive or negative, with a positive value indicating the score is above the mean and a negative score indicating it is below the mean.

A positive z-score says the data point is above average.

* A negative z-score says the data point is below average.
* A z-score close to 000 says the data point is close to average.
* A data point can be considered unusual if its z-score is above 333 or below -3−3minus, 3.
1. **Quartile:**

A quartile is a quartile category that divides the number of data points into four sections, or quarters, more or less equal. The first quartile (Q1) is defined as the mid number between the smallest and the data set median. It is also known as the lower quartile or the empirical quartile 25th, and it marks where 25 percent of the data are below or to the left. The second quartile (Q2) is the median of a collection of data and below this level resides 50 percent of the results. The third quartile (Q3) is the midpoint between the mean and the data set's peak value. This is also known as the upper quartile or 75th analytical quartile and is below this level in 75 percent of the results. Because the data must be ordered from the smallest to the largest for calculating quartiles, quartiles are a form of order statistics.

Along with the minimum and average results, which are both quartiles, the three quartiles mentioned above include a description of the data in five numbers. This summary is important in statistics, as it provides information about the center as well as the data spread. Knowing the lower and upper quartile offers details about the extent of the distribution, and how the sample is biased to one edge. Because quartiles evenly divide the number of data points, the range between quartiles is not the same (i.e., Q3-Q2 Q2-Q1). Whereas the maximum and minimum also indicate the data spread. The upper and lower quartiles will include more precise statistics on the position of different data points, the existence of outliers in the data, and the discrepancies between the middle 50 per cent of the data and the outer data points.

**Q4 (A)**

**SCOPE OF QUANTITATIVE TECHNIQUES:**

**PRODUCTION MANAGEMENT:** Quantitative technique very important for the production manager the manager take the decision related to production of the organization. Like management of the selecting the best location site for the plant. Locating and controlling the movement of required manufacturing material and inventories of finished goods and (C) production timing and spacing by sufficient proactive monitoring for optimal product selection. Production manager also qualitative control, work scheduling and also maintenance of training programmers.

**PERSONAL MANAGEMENT:** Quantitative techniques also important for the personal management.it planning about the organization that how many people require by the organization and how many will promote it also planning about the number of employee to hire,  the number of persons to be kept in a work pool intended for meeting the absenteeism. They also assign the duty to the employ and make of job policies and also make increment annual basis

**MARKETING MANAGEMENT**: It also help to marketing management and the decision should be taken related to distribution of warehouse and where the best location for the warehouse. And management of keep stock in the warehouse according to customer demand. And also make decision related to advertisement and keep contacting with salesman. The choice of different media of advertising and bidding strategies. And best selection according to market and make order to company to make production more.

**FINANCIAL MANAGEMENT:** Through quantitative the make management related all the financial management. The finance management take the decision related to finance available of short and long term loan. Make different management like determining the capital structure, select the best choice of fund from the outside source. Use of company fund in best way, disposal of profit.

**Q4 (B) ADVANTAGES OF METHEMATICAL MODELING:**

1Models can represent reality with precision. A sample can be highly reliable if correctly worded. A good model is one that is consistent and the problem or structure under review is accurately described.

2. Models can assist in formulating problems for a decision maker. For example, in the benefit model, a decision maker may evaluate the major drivers or contributors to profits and expenditures such as purchases, dividends, marketing costs , cost of development, cost of transportation, etc.

3 this model save the time and solve the problem.it save the time and analyze a model. We can use a profit model to analyze the impact on profit, revenue, and expenditure of a new marketing campaign. Use templates is in most situations quicker and easier than simply attempting a marketing strategy in a particular company environment and watching the effects

4 A model can be the only way to timely solve some large or complex problems. For example, a large company can literally produce thousands of sizes of nuts, bolts, and fasteners. Given its manufacturing constraints, the firm may want to make the highest profits possible.

5 from this we can easily communicate the problem and solution to others. A decision analyst may coordinate their research with other policy analysts. Managers and executives can be given solutions to a mathematical model to help them take final decisions.

6 Models can inform and give us insight. Using the benefit model from the previous segment, for example, we will see what affect shifts in sales and expenditures would have on earnings. The study of the impact of changes in a model, such as a profit model, is called sensitivity analysis as discussed in the previous section.