GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Business

Master of Business Administration MBA Dual Specialization
Semester End Examination - Aug 2024

Duration : 180 Minutes
Max Marks : 100

Sem I - D1PK104T/MSB21T2014 - Business Statistics for Decision Making

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1) Compare and contrast the Correlation analysis and Regression Analysis with some practical example. K5(5)

2) The following data related to the marks given by 2 judges in a beauty contest held in United states of America in the year 2019. Apply the appropriate statistical techniques for establish the relationship between ranking of the two judges in the beauty contest and interpret the result. K3(6)

Participants	Mark by Judge P	Mark by Judge Q
1	52	65
2	53	68
3	42	43
4	60	38
5	45	77
6	41	48
7	37	35
8	38	30
9	25	25
10	27	50

3) A husband and wife appear in an interview for two vacancies in the same post. The probability of husband's selection is 1/7 and that of wife's selection is 1/5. Examine the probability that (i)both of them will be selected (ii) at least one of them will be selected (iii) None of them will be selected K4(8)

4) The Manager of a logistic company has been worried about the rapid increase of inventory carrying over the past 9 years. The data given below indicates the year and inventory carrying cost from 2015 to 2023. K4(8)

Examine (a) 5-year moving average for the unit cost of the product (b) 4-year centred moving average

Year	Cost Per Unit
2006	342
2007	327
2008	367
2009	382
2010	412
2011	425
2012	433
2013	448
2014	456

5) The mean production of wheat from a sample of 100 fields is 200 K3(9)

lbs per acre with a standard deviation of 10 lbs. Another sample of 150 fields gives the mean at 220 lbs per acre with a standard deviation of 12 lbs. Assuming the standard deviation of the universe as 11 lbs, Choose 1 per cent level of significance, whether the two results are consistent?

6) The Board of Governors of the Federal Reserve System publishes data on mortgage debt outstanding by type of property and holder. The following data give the amounts of residential nonfarm debt (in $ billions) held by savings institutions in the United States over a 10-year period. Make use of these data to develop a regression model and discuss the strength of the model. K3(9)

Year	Debt
1	520
2	550
3	560
4	600
5	670
6	665
7	600
8	530
9	490
10	470

7) The average life of 26 electric bulbs were found to be 1200 hrs with a standard deviation of 150 hours. Justify whether these bulbs could be considered as a random sample from a normal population with mean 1300 hrs. (Use Statistical table to calculate the value). K5(10)

8) In a post office, three clerks are assigned to process incoming mail. The first clerk, A, processes 40 per cent; the second clerk, B, processes 35 per cent; and the third clerk, C, processes 25 per cent of the mail. The first clerk has an error rate of 0.04, the second has an error rate of 0.06, and the third has an error rate of 0.03. A mail selected at random from a day's output is found to have an error. The postmaster wishes to examine the probability that it was processed by clerk A or clerk B or clerk C. K4(12)

9) Maquiladora program 1965, Mexico initiated its widely known maquiladora program that permits corporations from the United States and other countries to build manufacturing facilities inside the Mexican border, where the company can import supplies and materials from outside of Mexico free of duty, assemble or produce products, and then export the finished items back to the country of origin. Mexico's establishment of the maquiladora program was to promote foreign investment and jobs in the poverty-stricken country and, at the same time, provide a cheaper labour pool to the participating companies, thereby reducing labour costs so that companies could more effectively compete on the world market. The maquiladora effort has been quite successful, with more than 3,500 registered companies participating and more than 1.1 million maquiladora workers employed in the program. It has been estimated that $50 billion has been spent by maquiladora companies with suppliers. Recently, industry exports were approaching $65 billion. About 1,600 of the maquiladora plants are located in the U.S.-Mexico border area, where about 40% manufacture electronic equipment, materials, and supplies. In recent years, the maquiladora program has spread to the interior of Mexico, where maquiladora employment growth has been nearly K5(15)

30%. Maquiladora companies also manufacture and assemble products from the petroleum, metal, transportation, and medical industries, among others. Whereas most maquiladora companies in the early years utilized low-skilled assembly operations, in more recent years, maquiladoras have been moving toward sophisticated manufacturing centres. The maquiladora program now encompasses companies from all over the world, including Japan, Korea, China, Canada, and European countries. What are the Mexican maquiladora workers like? What are their attitudes toward their jobs and their companies? Are there cultural gaps between the company and the worker that must be bridged in order to utilize the human resources more effectively? What culture-based attitudes and expectations do the maquiladora labourers bring to the work situation? How does a business researcher go about surveying workers? To address all these questions an investigator/researcher is planning to conduct a survey Managerial and Statistical Questions: Appraise the scenario, if researchers decide to survey maquiladora workers to ascertain the workers' attitudes toward and expectations of the work environment and the company. 1. Should the researchers take a census of all maquiladora workers or just a sample? What are reasons for each? 2. If a sample is used, what type of sampling technique would gain the most valid information? How can the researchers be certain that the sample of workers is representative of the population? 3. How can survey questions be analysed quantitatively? 4. Discuss the procedure to test the hypothesis "Cultural difference of the workers and performance of their output" (Mention Null hypothesis, alternative hypothesis, type of test, etc)

10) Shell Oil Company attempts to return the premiere Status The Shell Oil Company, which began about 1912, had been for decades a household name as a quality oil company in the United States. However, by the late 1970s much of its prestige as a premiere company had disappeared. How could Shell regain its high status? In the 1990s, Shell undertook an extensive research effort to find out what it needed to do to improve its image. As a first step, Shell hired Responsive Research and the Opinion Research Corporation to conduct a series of focus groups and personal interviews among various segments of the population. Included in these were youths, minorities, residents in neighbourhoods near Shell plants, legislators, academics, and present and past employees of Shell. The researchers learned that people believe that top companies are integral parts of the communities in which the companies are located rather than separate entities. These studies and others led to the development of materials that Shell used to explain their core values to the general public. Next, PERT Survey Research ran a large quantitative study to determine which values were best received by the target audience. Social issues emerged as the theme with the most support. During the next few months, the advertising agency of Ogilvy & Mather, hired by Shell, developed several campaigns with social themes. Two market research companies were hired to evaluate the receptiveness of the various campaigns. The result was the "Count on Shell" campaign, which

K6(18)

featured safety messages with useful information about what to do in various dangerous situations. A public “Count on Shell” campaign was launched in February 1998 and met with considerable success: the ability to recall Shell advertising jumped from 20% to 32% among opinion influencers; more than 1 million copies of Shell’s free safety brochures were distributed, and activity on Shell’s Internet “Count on Shell” site remains extremely strong. By promoting itself as a reliable company that cares, Shell seems to be regaining its premiere status. Today, Shell continues its efforts to be “community friendly.” United Way of America announced Shell Oil Company as one of its three Spirit of America Summit Award winners for 2002 and commended the company for its outstanding volunteer and corporate contributions programs. Several Shell employees were recognized by the Houston Minority Business Council for their continued efforts to provide windows of opportunity for minority business owners and strengthen Shell’s commitment to supplier diversity. Shell employees and retirees give back to their communities through such Shell-sponsored activities as America’s WETLAND campaign, Shell’s Workforce Development Initiative, and other community/quality of life and environmental projects. Shell is also a strong supporter of the Points of Light Foundation, which strives to engage people more effectively in volunteer community service. Discussion Questions 1. Suppose you were asked to develop a sampling plan to determine what a “premiere company” is to the general public. What sampling plan would you use? What is the target population? What would you use for a frame? Which types of random sampling can be used? Could you use a combination of two or more of the types (two-stage sampling)? If so, how? 2. It appears that at least one of the research companies hired by Shell used some stratification in their sampling. What are some of the variables on which they are stratified? If you were truly interested in ascertaining opinions from a variety of segments of the population with regard to opinions on “premiere” companies or about Shell, what strata might make sense? Name at least five and justify why you would include them 3. How will you test the following hypothesis in the above context. ‘The greater involvement of companies in community program, better would be the public image’. (Discuss the procedure for testing the hypothesis. (mention the null hypothesis, alternative hypothesis, type of hypothesis test etc.)