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DEPARTMENT OF MANAGEMENT STUDIES



BA4212

DATA ANALYSIS & BUSINESS MODELING

LAB RECORD

II SEMESTER

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EX.NO:1

DESCRIPTIVE STATISTICS

DATE:

AIM: To obtain a frequency table, measures of central tendency and variability using SPSS.

ALGORITHM:

Step 1: Select the Analyze menu

Step 2: Click on Descriptive Statistics and then on Frequencies... to open the Frequencies dialogue box

Step 3: Select the variables you require and click on the button to move the variable into the variables box.

Step 4: Click on the Statistics... command push button to open the Frequencies: Statistics Sub-dialogue box.

Step 5: In the Percentile values box, select the Quartiles check box.

Step 6: In the Central Tendency box, select the Mean, Median and mode check boxes.

Step 7: In the Dispersion box, select the standard deviation, variance, range, Minimum and maximum check boxes.

Step 8: Click on continue. Click on the charts... command push button to open frequencies charts sub-dialog box.

Step 9: click on the histograms/pie chart/bar chart button. You will notice that you can also obtain a normal curve overlay, so click on the with normal curve check box.

Step 10:Click on continue and then ok.

PROBLEM FOR PRACTICE: Take Sample size=25

| Variable name | Type | width | label | values |
|----------------------|-------------|--------------|------------------|---|
| Name | String | 12 | Name | Nil |
| Gender | number | 2 | Gender | 1-male , 2-female |
| Age | Number | 2 | Age | 1=<25 2=26-30 3=31-35 4=>36 |
| Occpn | Number | 2 | Sector | 1= student 2=salaried 3= business |
| Mob-use | Number | 2 | Usage of Mobile | 1=<6 months 2=1-2yrs 3=>2yrs |
| Mob-rea | Number | 2 | Reason for usage | 1=convenience 2=business 3=status |
| Mob-amo | Number | 2 | Amount for spend | 1=<500 2=501-700 3=>701 |

Result: The descriptive statistics have been done using SPSS .

EX NO: 2
DATE:

INDEPENDENT SAMPLE t-TEST

AIM: To perform independent sample t-test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view, name the variable as “Diet” under name, select Numeric under type, and label as Diet under label.
2. Click on the grey area under Value. A popup window opens , type 1 in the value box and “Diet A” in Label box and click Add to transfer it to the box below. Type 2 in the value box and “Diet B” in Label box and click Add to transfer it to the box below and click ok.
3. Go to second row and type “Haemoglobin” under Name select Numeric under Type, type as “Level of haemoglobin (gm %) under label.
4. Click Data view and enter data in the column under Diet and Haemoglobin.
5. Choose Analyse, select compare means and then select Independent Samples T-Test.
6. Independent-Samples T-Test window opens, transfer Haemoglobin to Test Variables and Diet to Grouping Variable.
7. Click on Define Groups, a pop up window with Define Groups opens. Type 1 under Group 1 and Type 2 under Group 2. Click continue
8. Click options. A pop up window opens. Check the confidence interval box as 95%, click continues.
9. Click ok to run the analysis and get the required output.

PROBLEM FOR PRACTICE: Two groups of children were fed on 2 different diets namely, diet A and Diet B. The level of haemoglobin in blood were estimated and presented in the table below. Test the superiority of diet B over diet A in increasing the haemoglobin level.

| DIET | HAEMOGLOBIN (GM %) | | | | | | | | | | | | | |
|-------------|---------------------------|----|----|----|----|---|----|-----|----|----|----|----|----|----|
| A | 10 | 11 | 12 | 11 | 10 | 9 | 10 | 9.5 | 12 | 13 | 11 | 11 | 12 | 10 |
| B | 11 | 11 | 12 | 13 | 11 | 9 | 12 | 10 | 11 | 12 | 12 | 12 | 13 | 10 |

RESULT: Thus independent sample t-test using SPSS was done.

EX NO: 3

ONE SAMPLE t-TEST

DATE:

AIM: To perform One sample t-test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view, name the variable as “Haemoglobin HB ” under name, select Numeric under type, and label it as Haemoglobin(gm%)
2. Click Data view and enter data in the column under Haemoglobin
3. Choose Analyze, select compare means and then select One-sample T Test.
4. Transfer the variable under study “Haemoglobin (gm %)to test variable and type in the test value box as 13 (Here we are testing whether the mean level of haemoglobin of this sample differs significantly from the normal level of 13gm % expected for women in the population)
5. Click options. A pop up window opens. Check the confidence interval box as 95%, click continues.
6. Click ok to run the analysis and get the required output.

PROBLEM FOR PRACTICE:

ONE SAMPLE T-TEST: The following data gives the haemoglobin level (gm%) in a group of 15 women students studying in a college. Test whether the haemoglobin level in the women is significantly lower than the average level of 13 gm% expected for women population. Infer whether the women in the age group are having the tendency towards anemia.

| Case | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|-----------|----|----|----|----|---|---|----|----|----|----|----|----|----|----|----|
| HG (gm %) | 10 | 12 | 11 | 10 | 9 | 8 | 12 | 10 | 11 | 9 | 10 | 12 | 11 | 9 | 10 |

RESULT: Thus One sample t-test using SPSS was done.

EX NO: 4
DATE:

PAIRED SAMPLE t-TEST

AIM: To perform Paired sample t-test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view, name the variable as “HB Before” under name, select Numeric under type, and label it as before-haemoglobin.
2. Go to second row and type “Haemoglobin after” under Name select Numeric under Type, type as “After Haemoglobin (gm %) under label.
3. Click Data view and enter data in the column under Before and After.
4. Choose Analyse, select compare means and then select Paired Samples T-Test.
5. Paired-Samples T-Test window opens, transfer Before Haemoglobin to Variable1 and After Haemoglobin to Variable2.
6. Click options. A pop up window opens. Check the confidence interval box as 95%, click continues.
7. Click ok to run the analysis and get the required output.

PROBLEM FOR PRACTICE:

PAIRED SAMPLE T-TEST: An investigator wants to evaluate the effect of a particular supplementary diet in increasing the level of haemoglobin in man. He selected a group of 15 individuals, the level of haemoglobin in these persons was estimated and then these individuals were fed on the supplementary diet. After feeding for a sufficient period of time, the level of haemoglobin in these persons were estimated. The data obtained in this study is given in the form of table. Evaluate the efficiency of the supplementary diet in increasing haemoglobin (gm %) level.

| | | | | | | | | | | | | | | | |
|---------------|----|----|----|----|-----|------|------|----|-----|------|----|----|------|------|-----|
| BEFORE | 10 | 12 | 11 | 10 | 9.5 | 10.5 | 11.5 | 10 | 9.8 | 10.5 | 12 | 11 | 11.5 | 10.5 | 9.9 |
| AFTER | 11 | 12 | 12 | 11 | 10 | 11.5 | 12 | 10 | 10 | 11 | 13 | 12 | 12 | 11 | 10 |

RESULT: Thus Paired sample t-test using SPSS was done.

EX: NO: 5

ONE WAY ANOVA

DATE:

AIM: To perform ONE WAY ANOVA using SPSS

PROCEDURE:

1. Open new data file and make variables for city (1-Delhi, 2-Kolkata, 3-Mumbai and 4-Chennai) and sales. Enter the sales data of 40 respondents.
2. Click analyze--compare means—one way ANOVA—Shift the **sales** variable to **dependent list** and **City** variable to **Factor** column.
3. Click contrasts. Push button to open its sub dialogue box. Enter the coefficients as 2, 1,-1,-2. Note that the coefficient total should be zero. Click continues.
4. Click Post Hoc...push button to check the significance level in the Post Hoc Sub dialogue box. In this case it is 0.05. Click continues.
5. Click options.. Push button to open its sub dialogue box. Select descriptive and Homogeneity of Variance test and click continue & ok to generate output

PROBLEM FOR PRACTICE: Ritu wants to know the sales in four different metro cities of India in Diwali Season. She assumes the sales contrast of 2:1:-1:-2 for Delhi, Kolkata, Mumbai and Chennai respectively. She collects sales data from 10 respondents each from the four metro cities, collecting a total of 40 sales data.

| City | Sales in Rs.(Lacs) | | | | | | | | | |
|------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 400 | 450 | 499 | 480 | 495 | 300 | 350 | 356 | 269 | 298 |
| 2 | 389 | 398 | 399 | 498 | 457 | 400 | 300 | 298 | 369 | 348 |
| 3 | 488 | 469 | 425 | 450 | 399 | 385 | 299 | 298 | 389 | 390 |
| 4 | 450 | 400 | 428 | 398 | 359 | 360 | 310 | 295 | 322 | 365 |

RESULT: Thus ONE WAY ANOVA using SPSS was done.

EX NO: 6

TWO WAY ANOVA

DATE:

AIM: To perform TWO WAY ANOVA using SPSS.

PROCEDURE:

1. Click Analyze, General Linear Model, Univariate... This will open Univariate Dialogue box.
2. Choose the dependent variable and send it in dependent variable box. Similarly, choose independent variables to send them in fixed factors list box.
3. Click options push button to open its sub dialogue box.
4. Click Descriptive Statistics, Estimates of effect size, observed power and Homogeneity tests check boxes in the Display box and click continue. Previous dialogue box will open.
5. Click ok to run the analysis and get the required output.

PROBLEM FOR PRACTICE:

Perform to find the interactive influence of herb and gender on blood sugar level (mg/100ml)

| NORMAL | | DIABETIC | | HERB 1 | | HERB 2 | |
|--------|--------|----------|--------|--------|--------|--------|--------|
| male | female | Male | female | male | Female | Male | female |
| 96 | 101 | 180 | 270 | 180 | 192 | 120 | 130 |
| 100 | 97 | 225 | 250 | 190 | 170 | 130 | 125 |
| 111 | 110 | 260 | 230 | 185 | 169 | 130 | 126 |
| 98 | 108 | 250 | 220 | 190 | 198 | 135 | 140 |
| 106 | 102 | 265 | 267 | 180 | 174 | 136 | 138 |
| 105 | 111 | 280 | 284 | 170 | 180 | 140 | 119 |

RESULT: Thus TWO WAY ANOVA using SPSS was done

EX NO: 7

CHI-SQUARE TEST

DATE:

AIM: To perform Chi-square test using SPSS.

PROCEDURE:

STEP 1: Open a new data file in SPSS

STEP 2: Name the variables in **Variable view**. Click variable view, type the variable in the first row as “Gender” under **Name**, Select **Numeric** under **Type**, Select 0 under **Decimals**, label the Variable under **Label** Column. In the **Values** columns click the gray area, to get **Value labels** dialog box and assign value **number and labels** as 1 for male and 2 for female. In the second row, type the second variable as “Blood group” under the column **Name**, select **Numeric** under **Type**, Select **0** under **Decimals**, label the variable as “Blood group” under Label column. In the **Values** column click the grey area to get **Value labels** dialog box and assign value **number and label** as 1 for A, 2 for B, 3 for AB and 4 for O.

STEP 3: In the third row type Frequency under Name, Select Numeric under Type, select 0 under the column Decimals, label column as “Frequency”. There is no need to give value labels under Values.

STEP 4: Click on Data view and enter data under the respective variables as labeled in Variable View

STEP 5: Select Data from the main menu and then click Weight cases. Select Weight cases by and transfer Frequency to frequency variable. Click ok. Now the entire display will disappear.

STEP 6: Select **Analyse** from the main menu then click Descriptive statistics and then click **cross tabs**. Transfer Gender and Blood group in rows and column boxes respectively. If you want bar diagram select **Display cluster bar chart**. Click the **statistics** button.

STEP 7: Crosstabs: Statistics window appear. Choose chi-square. Click continues.

STEP 8: Finally click ok to run the analysis. SPSS Output appears and interprets the results. If the value is greater than 0.05, then null hypothesis is accepted.

PROBLEM FOR PRACTICE: INDEPENDENCE OF ATTRIBUTES

A Group of students were classified in terms of gender and blood group (A, B, AB and O). Find whether there is association between gender and blood group.

| GENDER | BLOOD GROUP | | | | TOTAL |
|---------------|--------------------|----------|-----------|----------|--------------|
| | A | B | AB | O | |
| MALE | 28 | 16 | 7 | 49 | 100 |
| FEMALE | 25 | 13 | 8 | 54 | 100 |
| TOTAL | 53 | 29 | 15 | 103 | 200 |

Two groupings of categorical variables are Gender-male and female, Blood group-A, B, AB and O

RESULT: Thus Chi-square test using SPSS was done.

EX NO: 8
DATE:

MANN WHITNEY U TEST

AIM: To perform MANN WHITNEY U Test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view and define the variables under name, type, label, values, etc.,
2. Click on Data view and enter data
3. Choose Analyze, click Non-parametric and then select 2 independent samples
4. In the two-independent samples tests dialog box, transfer pulse rate in counts/mins to test variable list box and gender to grouping variable box and click continue.
5. The previous step will bring you back to TWO-independent samples tests pop up window, now select U test under test type.
6. Click ok to run the analysis and get the required output.

PROBLEM FOR PRACTICE: The pulse rate (pulse/min) of 2 independent random samples, one from male population and the other from female population sitting inside a fast moving coach are given below. Find out whether there is a difference in the mean pulse rate of 2(male and female) populations.

| | | | | | | | | | | | | | |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|
| MALE | 72 | 69 | 72 | 68 | 68 | 70 | 70 | 68 | 68 | 69 | 69 | 75 | 74 |
| FEMALE | 73 | 72 | 75 | 70 | 68 | 73 | 74 | 74 | 70 | 72 | 71 | 71 | 63 |

HINT: Ho: The pulse rate of both male and female sitting inside a fast moving coach is equal, Grouping variable [Gender(1,2)], Test variable: Pulse rate

RESULT: MANN WHITNEY U Test using SPSS was done.

EX NO: 9

KRUSKAL-WALLIS H TEST

DATE:

AIM: To perform KRUSKAL WALLIS- H Test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view and define the variables under name, type, label, values, etc.,
2. Click on Data view and enter data
3. Choose Analyze, click Non-parametric and then select K independent samples
4. This will open tests for several independent samples dialog box, transfer dependent and independent variable in test variable list & grouping variable box respectively.
5. Now select H test under test type.
6. Click on define range and give minimum 1 and maximum 3, and click continue to get the required output.

PROBLEM FOR PRACTICE:

The SPSS Vice president Sales has developed 3 new training programs for increasing sales effectiveness. These are 60 new hires in the organization. He has randomly chosen 10 people for each training program. After one year, he decides to see the results. Perform H test. Sales value is in lakhs. [Test Variable: Sales, Grouping Variable: Prog (1,3)]

| | | | | | | | | | | |
|----------------|--------|-----|-----|-----|-----|-----|-----|----|----|----|
| I PROG | 45.00 | 10 | 12 | 30 | 50 | 25 | 33 | 45 | 45 | 50 |
| II PROG | 100.00 | 150 | 134 | 123 | 123 | 145 | 167 | 89 | 89 | 67 |
| III PRO | 10.00 | 222 | 22 | 22 | 45 | 332 | 89 | 23 | 54 | 76 |

RESULT: Thus **KRUSKAL WALLIS- H Test using SPSS was done.**

EX NO: 10
DATE:

WILCOXON SIGNED RANK TEST

AIM: To perform WILCOXON SIGNED RANK Test using SPSS.

PROCEDURE:

1. Open Data Editor, click variable view and define the variables under name, type, label, values, etc.,
2. Click on Data view and enter data
3. Choose Analyze, click Non-parametric and select 2 Related Samples
4. A pop window appears as Two- related samples test. Select the variable to be analyzed and send it in variables list box by clicking the right arrow button. Similarly do this for other variables 1 & 2.
5. Select Wilcoxon under Test type and Click options. Two-related samples: Options dialog box opens.
6. Select Descriptive under Statistics and click continue. Click ok to see the output.

PROBLEM FOR PRACTICE:

| | | | | | | | | | | | | | | | |
|--------|-----|-----|-----|-----|-----|---|------|-----|-----|---|-----|-----|-----|-----|-----|
| Drug A | 3 | 2 | 3.6 | 2.6 | 7.4 | 3 | 16 | 7 | 3.3 | 2 | 6.8 | 8.5 | 7 | 8 | 5.6 |
| Drug B | 3.5 | 3.5 | 5.7 | 2.4 | 9.9 | 4 | 18.7 | 6.6 | 4.5 | 4 | 9.1 | 1.8 | 8.5 | 7.5 | 2.9 |

The TABLE shows the hours of relief provided by 2 analgesic drugs in 15 patients suffering from arthritis. Is there any evidence that one drug provides longer relief than the others? Use Wilcoxon signed rank test.

RESULT: Thus WILCOXON SIGNED RANK Test using SPSS was done.

EX NO: 11
DATE:

SPEARMAN RANK CORRELATION

AIM: To perform Rank correlation Test using SPSS.

PROCEDURE:

STEP1: Name the variables in Variable View and data in Data editor

STEP2: Click Analyze then select correlate and click bivariate.

STEP3: Transfer both the variables to variables box and select spearman under correlation coefficients and two-tailed under test of significance.

STEP4: Click OK to run the analysis

STEP5: If the value is greater than 0.05, the correlation coefficient is insignificant.

PROBLEM FOR PRACTICE: Compute Spearman's rank correlation coefficient for the data given below on academic achievements and family income.

| | | | | | | | | | | |
|--------------------|------|------|------|-------|-------|------|-------|------|------|------|
| Grade points | 75 | 73 | 96 | 61 | 71 | 56 | 50 | 85 | 90 | 54 |
| Family income(Rs.) | 8500 | 7000 | 6000 | 12000 | 12000 | 5000 | 18000 | 9000 | 7000 | 8200 |

RESULT: Thus Rank correlation Test using SPSS was done.

EX.NO: 12
DATE:

CORRELATION: BIVARIATE ANALYSIS WITH SPSS

AIM: To perform correlation coefficient test using SPSS

PROCEDURE

STEP1: Open the data editor and click the Variable view and then enter the name of variables and details of the variables.

STEP2: Click Data view and enter data under appropriate variable.

STEP3: Select Analysis from the main menu and select Correlate from the drop down menu and then select Bivariate.

STEP 4: Bivariate correlations dialog box opens.

STEP 5: Transfer variables into Variables box, select Pearson under Correlation Coefficients and select Two-tailed under Test of Significance and Flag Significant Correlations.

STEP 6: Click options to open Bivariate Correlations: Options, select Mean, Standard Deviation under Statistics, so that you can get some descriptive statistics in the output.

STEP 7: Click continue and ok to run the analysis. Two outputs are generated.

PROBLEM FOR PRACTICE: Find out correlation coefficient for the variables, age (years) and systolic blood pressure (mmHg) in man.

| | | | | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Age | 56 | 42 | 60 | 50 | 54 | 49 | 39 | 62 | 65 | 70 | 40 | 53 |
| BP | 160 | 130 | 125 | 135 | 145 | 115 | 140 | 120 | 140 | 160 | 126 | 145 |
| Age | 35 | 38 | 39 | 37 | 70 | 75 | 65 | 64 | | | | |
| BP | 118 | 120 | 123 | 138 | 160 | 163 | 145 | 146 | | | | |

RESULT: Thus correlation coefficient test using SPSS was done.

EX: NO: 13
DATE:

SIMPLE REGRESSION

AIM: To perform Simple Regression using SPSS

PROCEDURE:

STEP1: Open Data Editor and click Variable View. Enter the name of variables and details of the variables.

STEP2: Click Data view and enter data under appropriate variable

STEP3: Select Analyse from the main menu and select **Regression** and Linear from the drop down menu.

STEP 4: **Linear Regression** dialog box opens. Transfer **Systolic pressure** to **Dependent box** and **Age** to **Independent Box**.

STEP 5: Click Statistics to open Linear Regression: Statistics dialog box, select estimates, descriptives and model fit, then click continue.

STEP 6: Click plots to open Linear Regression: Plots and transfer *ZRESID (dependent or criterion) to Y: box and * ZPRED (independent or predictor) to X: box and then click Continue.

STEP 7: Click Ok to run the analysis

PROBLEM FOR PRACTICE:

Formulate regression equation of Y (systolic pressure mm Hg) on X (age) in man. Predict the most probable value of systolic pressure for ages 51 and 68.

| | | | | | | | | | | | | |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Age | 56 | 42 | 60 | 50 | 54 | 49 | 39 | 62 | 65 | 70 | 40 | 53 |
| BP | 160 | 130 | 125 | 135 | 145 | 115 | 140 | 120 | 140 | 160 | 126 | 145 |
| Age | 35 | 38 | 39 | 37 | 70 | 75 | 65 | 64 | | | | |
| BP | 118 | 120 | 123 | 138 | 160 | 163 | 145 | 146 | | | | |

RESULT: Thus Simple Regression using SPSS was done.

EX: NO: 14 FINANCIAL MANAGEMENT USING MS- EXCEL

DATE:

Aim: To Calculate Interest rate, Future value of investment and calculation of EMI using Excel.

Procedure:

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem (a)
2. Type Interest Rate in A7 and keep the cursor in B7
3. Go to insert function (fx) --- insert function box will appear
4. Select “**Financial**” in select a category and select “**rate**” in select a function
5. Type Nper = 48 , Pmt = 6000, Pv = -200000 in function arguments and click ok
6. Rate will appear for months, to calculate annual interest rate add *12 in the above formula
7. Output will be displayed in the specified Cell
8. Type the given problem (b)
9. Type future value A6 and keep the cursor in B6
10. Go to insert function (fx) --- insert function box will appear
11. Select “**Financial**” in select a category and select “**FV**” in select a function
12. Type Rate = 0.12/12 or calculate monthly interest rate by dividing 12, Nper = 24, Pmt= -2000
13. Output will be displayed in the specified Cell
14. Type the given problem (c)
15. Type EMI A7 and keep the cursor in B7
16. Go to insert function (fx) --- insert function box will appear
17. Select “**Financial**” in select a category and select “**PMT**” in select a function
18. Type Rate = 0.14/12 or calculate monthly interest rate by dividing 12, Nper = 180 or 15*12, PV= -400000
19. Output will be displayed in the specified Cell

PROBLEM FOR PRACTICE:

- (a) Suppose we have availed a loan of Rs. 2,00,000 that is paid off in 48 monthly installments of rupees 6000 each. Find out the rate of interest charged on this loan
- (b) You deposit Rs.2000 each and every month in your bank account. The bank pays 12% annual rate that is compound every month. Find out how much money will be in your account at the end of 24 months.
- (c) Suppose if you want to take a loan of Rs. 4,00,000 at an annual interest rate of 14%. The loan has to be repaid in 15 years in equal monthly installments. Find out the EMI.

RESULT: Thus Interest rate, Future value of Investment and EMI is successfully completed by using Excel.

EX: NO: 15

INVENTORY ANALYSIS USING MS-EXCEL

DATE:

AIM:

To Perform Inventory Analysis - Economic Ordering Quantity - Using Ms-Excel.

Procedure

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem
2. Calculate the following by giving the formulas in different Cells with Cell address
3. Where,
A = Annual usage = units per day * no. of days in a year= 18000 units
B = Cost per order =Handling charges + Freight Charges = Rs.500
C = Cost per unit = Cost per lot / No. of units per lot = Rs.10
S = Storage and carrying cost % per annum (15% + 5%)= 20%
4. Calculate $EOQ = \sqrt{2 \times (\text{Annual Usage} \times \text{Cost Per order}) / (\text{Cost per unit} \times \text{Storage \& Carrying cost})}$
5. Calculate No. or orders = (Annual Consumption / EOQ)
6. Calculate Frequency of order = (Number of Days or Months in a year / No. of orders)

PROBLEM FOR PRACTICE: A factory consumes 60 units of material per day which is supplied by a vendor in lots of 240 units each at Rs.2,400 per lot. The factory works for 300 days per annum.

Each order involves handling charges of Rs.120 and Freight charges of Rs.380. The storage cost is 5% and carrying cost is 15% per annum.


You are required to ascertain

1. No. of units to be ordered each time to minimize the overall inventory cost
2. No. of orders per annum
3. The frequency of placing orders.

RESULT: Thus Inventory Analysis – EOQ was performed using Ms-Excel.

AIM: To perform investment appraisal among four investment proposals for Small Wonders Ltd using Excel.

Procedure

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem
2. Type the problem from A1 cell (A1: Years, B1: Project 1, C1: Project 2, D1: Project 3, E1: Project 4. A7: Capital Available for each year, A8: Cost of capital)
3. Type NPV(Net Present Value) in A9 and place the cursor in B9 for project 1
4. press function option(fx)
5. Type NPV in search for function option  click go
6. In Select a function --- Select NVP function and ----click ok
7. Function Arguments popup box will open, in rate --- type cost of capital 0.15, in value 1 ---- select (B3:B6), close bracket and type + B2 (initial Investment)
8. Press enter
9. Output will be displayed in the specified range

PROBLEM FOR PRACTICE:

Small Wonders Ltd is a small manufacturer of microcomputers. The Board of Director of the firm is faced with the problem of evaluating four proposals and deciding which, if any, of the alternatives are acceptable. The table shows the expected cash flows of the project and available capital (Rs. '000s) over the next four years. Cash inflows are shown in positive and cash outflows are shown in negative and cost of capital is assumed as 15% per annum.

| Proposals | Year 1 | Year 2 | Year 3 | Year 4 |
|---------------------------------|--------|--------|--------|--------|
| 1 | -60 | 0 | 40 | 70 |
| 2 | -50 | -30 | 50 | 100 |
| 3 | -40 | -80 | 100 | 90 |
| 4 | | -35 | 110 | -50 |
| Capital available for each year | 100 | 100 | 50 | 50 |

You are requested to compute the proportion of investment in each projects that will maximize the NPV for Small Wonders Ltd.

RESULT: Thus investment appraisal for Small Wonders Ltd was successful completed using Excel

EX.NO: 17

RATIO ANALYSIS USING MS-EXCEL

Date

AIM: To Perform Ratio analysis (Average inventory and Average Debt Collection Period) Using Ms-Excel.

PROCEDURE:

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem
2. Calculate the following by giving the formulas in different Cells with Cell address
 - Cost of Goods Sold = Sales – Gross Profit
 - ITR = COGS / Avg. Inventory; Avg. Inventory = COGS / ITR
 - Current Ratio = Current Assets / Current Liabilities
 - Current Assets = Current Ratio x Current Liabilities
 - Current Assets = Cash + Inventories + Closing Debtors
 - Closing Debtors = Current Assets – (Cash + Inventories)
 - Average Debt Collection Period = (Avg. A/c Receivables / Credit Sales) * 365
 - Avg. A/c Receivables = (Opening Debtors + Closing Debtors) / 2

PROBLEM FOR PRACTICE:

Calculate

- (i) Average Inventory and
- (ii) Average Debt Collection Period from the following Data:

| | |
|---------------------------|--------|
| Credit Sales (Rs.) | 640000 |
| Gross Profit Margin | 0.15 |
| Current Ratio | 2.50 |
| Current Liabilities (Rs.) | 96000 |
| Inventories (Rs.) | 48000 |
| Cash (Rs.) | 16000 |
| Inventory Turnover Ratio | 5.00 |
| Opening Debtors (Rs.) | 80000 |

RESULT: Thus Ratio Analysis was performed using Ms-Excel.

EX.NO: 18

PORTFOLIO MANAGEMENT USING MS-EXCEL

DATE:

AIM: To perform portfolio management using Ms.Excel.

ALGORITHM:

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem
2. Type given problem: A2: Years, B2: company A, C3: Company B, D3: Company C
3. Type "Average Return" in A13 and place the cursor in A13 to calculate average return for company A.
4. press function option(fx)
5. Type Average in search for function option --- click go
6. Function arguments will open, select or type B3:B12 and click --- ok
7. Output will be displayed in the specified Cell
8. Continue for company B and Company C
9. Output will be displayed in the specified Cell

PROBLEM FOR PRACTICE:

Eby Abraham has recently inherited some money which he would like to invest in stock. Eby already holds stock in company A, and over the past ten years he has received an average annual return of 7.48% on his investment. He would like to increase this and hence informed his investment banker that an annual return of at least 12% is his desired objective. The bank's funds investment manager has forwarded details given below of two suitable companies B and C, whose stock performances meet Edby's requirements.

| Company | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---------|------|------|------|------|------|------|------|------|------|------|
| A | 8.5 | 15.3 | 11.5 | -1.6 | -3.6 | 8.4 | 6.8 | 11.9 | 6.1 | 11.5 |
| B | 6.7 | 9.2 | 11.3 | 17.7 | 7.4 | 13 | 19.5 | 15.1 | 19.4 | 15.2 |
| C | 15.1 | 27.8 | 38.6 | -12 | -5.6 | 12.7 | -2.1 | 12.8 | 36.8 | 22.7 |

RESULT: Thus Portfolio Management is successful completed using Excel

EX.NO: 19

REVENUE MANAGEMENT USING MS-EXCEL

DATE:

AIM: To perform Revenue Management for Xyz Company by calculating Sales for given EPS and calculating EPS for given sales using Excel.

ALGORITHM:

1. Start with Start menu bar -> Ms-Office -> Ms-Excel -> Type the given problem
2. Type the heading calculation of EPS in A11, Particulars in A12, Amount in B12
3. Type the variables like sales, expenses, fixed expenses, interest , tax and no of equity shares in column A and respective Amount in column B
4. Type **PBIT** in cell A16 and place a cursor in B16 – type this formula (=B13-B14-B15)
5. Type **PAIBT** in cell A18 and place a cursor in B18 – type this formula (=B16-B17)
6. Type **EAT** in cell A20 and place a cursor in B20 – type this formula (=B18-B19)
7. Type **EPS** in cell A22 and place a cursor in B18 – type this formula (=B20/B21)
8. EPS for Given problem calculated , now find sales to earn a EPS of Rs. 3
9. Type EPS Rs.3 and no of shares 10000 in cell E13 and F13
10. Calculate EAT by using this formula $EAT = EPS * \text{no of shares}$
11. Calculate PAIBT by using this formula $PAIBT = EAT + \text{Tax}$
12. Calculate PBIT by using this formula $PBIT = PAIBT + \text{Interest}$
13. Calculate sales by using this formula $\text{sales} = PBIT + \text{Expenses} + \text{Fixed expenses}$
14. Therefore output i. e desired sales to earn a EPS will be displayed in specified cell
15. Repeat the step 2 to 7 for reduction in expenses by 5% and 10% respectively
16. Output will be displayed in the specified Cell

PROBLEM:

Xyz Company made an EPS of Rs. 2. Confirm the above with the following data.

- Sale of Rs. 1,50,000
- Expenses Rs. 1,00,000
- Fixed Expenses Rs. 20,000
- Interest Rs. 2000 (10% of the fixed expenses)
- Tax 8,400 (30%)
- Number of shares 10000

As the sales manager of the firm, you need to know what would be the effect of sales on EAT and EPS. What would be your target for the sales forces so that the investors could earn an EPS of Rs. 3. Also find out what will be the effect of cost cutting measures that would result in 5% and 10% reduction in the expenses respectively.

RESULT: Thus revenue Management for Xyz Company is successfully completed by calculating Sales for given EPS and calculating EPS for given sales using Excel.

EX: NO: 20 TRANSPORTATION USING POM

DATE:

AIM: To determine the optimal solution for given transportation problem using POM Modules

ALGORITHM:

Step 1: Open a POM applications

Step 2: Select LP transportation Module

Step 3: Go to production menu

Step 4: Enter the values for row & columns

Step 5: Enter the object values, capacity & demand for the restrictions

Step 6: Select the solve in the menu

Step 7: Run the output

Step 8: Save the output file with suitable file name

PROBLEM FOR PRACTICE

Solve the **transportation problem**

| SOURCE | DESTINATION | | | | SUPPLY |
|---------------|--------------------|----------|----------|----------|---------------|
| | A | B | C | D | |
| 1 | 40 | 25 | 22 | 33 | 100 |
| 2 | 44 | 35 | 30 | 30 | 30 |
| 3 | 38 | 38 | 28 | 30 | 70 |
| DEMAND | 40 | 45 | 60 | 55 | |

RESULT: The optimal solution for given transportation problem using POMModules was done.

EX: NO: 21

ASSIGNMENT USING POM

DATE:

AIM: To calculate maximum profit & minimum cost in assignment using POM Modules

ALGORITHM:

Step 1: Open a POM applications

Step 2: Select assignment Module

Step 3: Go to production menu

Step 4: Enter the values for row & columns

Step 5: Enter the object values

Step 6: Select the solve in the menu

Step 7: Run the output

Step 8: Save the output file with suitable file name

PROBLEM FOR PRACTICE:

Solve the **assignment problem using POM**. Assign the salesmen to the territories for maximizing sales.

| | | TERRITORIES | | | |
|-----------------|----------|--------------------|----------|----------|----------|
| | | 1 | 2 | 3 | 4 |
| SALESMEN | A | 120 | 100 | 80 | 90 |
| | B | 80 | 90 | 110 | 70 |
| | C | 110 | 140 | 120 | 100 |
| | D | 90 | 90 | 80 | 90 |

RESULT: Calculation of maximum profit & minimum cost in assignment using POM Modules was done.

EX: NO: 22

ECONOMIC ORDER QUANTITY USING POM

DATE:

AIM: To calculate Economic order quantity using POM Modules

ALGORITHM:

Step 1: Open a POM applications

Step 2: Select fixed order quantity module

Step 3: Select module 1 in general menu

Step 4: Go to production menu

Step 5: Enter the given values

Step 6: Select the solve in the menu

Step 7: Run the output

Step 8: Save the output file with suitable file name

PROBLEM FOR PRACTICE

1. Find the EOQ and the number of orders if demand for the year is 2000 units. Ordering cost is Rs.500 per order and the carrying cost per unit per year is Rs.2.50.

RESULT: Calculation of Economic order quantity using POM Modules was done.

EX: NO: 23

FORECASTING USING POM

DATE:

Aim: To forecast sales for next period using POM

Procedure:

1. Select the module from the menu bar(In our case its Forecasting Using causal regression)
2. Open a new sheet with Time series analysis First enter the number of periods of past data,
3. enter the name of the variable you want to forecast,
4. enter the number of periods to forecast,
5. enter the percent confidence interval for forecast ranging,
6. Enter the number of most recent periods to be used in computing MAD, and enter the number of independent variables.
7. Then enter the name of each independent variable.
8. Next enter the past data in the grid on the left.
9. Finally enter the values of the independent variables for future periods to be forecasted, in the grid at the bottom right.

PROBLEM FOR PRACTICE:

A Firm believes that its annual profit depends on its expenditures for research. The information for the preceding 6 years is given below. Estimate the profit when the expenditure is 8 units.

| year | Expenditure for research (X) | Annual Profit in lacs (Y) |
|------|------------------------------|---------------------------|
| 2011 | 3 | 22 |
| 2012 | 4 | 27 |
| 2013 | 6 | 36 |
| 2014 | 5 | 32 |
| 2015 | 12 | 45 |
| 2016 | 7 | 36 |
| 2017 | 8 | ? |

RESULT: Forecasting for sales for next period using POM modules was done.

EX: NO: 24

LINEAR PROGRAMMING USING POM

DATE:

AIM: To determine the optimal solution for given linear programming using POM Modules

ALGORITHM:

Step 1: Open a POM applications

Step 2: Select Linear Programming Modules

Step 3: Enter given values

Step 4: Enter the values for constraints & objective function

Step 5: Select the solve in the menu

Step 6: Run the output

Step 7: Save the output file with suitable file name

PROBLEM FOR PRACTICE

Maximize $Z = X_1 + 2X_2 + 3X_3 - X_4$ subject to

$$X_1 + 2X_2 + 3X_3 = 15$$

$$2X_1 + X_2 + 5X_3 = 20$$

$$X_1 + 2X_2 + X_3 + X_4 = 10$$

$$X_1, X_2, X_3, X_4 \geq 0$$

RESULT: Determination of optimal solution for given linear programming using POM Modules was done.

EX: NO: 25

LINEAR PROGRAMMING USING TORA

DATE:

AIM: To Solve a linear programming problem using TORA

ALGORITHM:

Step 1: In the main menu select linear programming

Step 2: In the data entry, select new problem

Step 3: Enter the project title, number of variables and constraints.

Step 4: Specify objective function and constraints

Step 5: Specify the supply and demand amount

Step 6: Save the problem

Step 7: Select solve the problem

Step 8: Select automatic procedure to display the result and print the optimum result.

PROBLEM FOR PRACTICE

$$\text{MAX } Z = 2X_1 + 3X_2$$

Subject to

$$X_1 + X_2 \leq 400$$

$$2x_1 + X_2 \leq 600$$

$$X_1, X_2 \geq 0$$

RESULT: Solve a linear programming problem using TORA was done.

EX: NO: 26

TRANSPORTATION USING TORA

DATE:

AIM: To Solve a transportation problem using TORA

ALGORITHM:

Step 1: In the main menu select transportation model

Step 2: In the data entry, select new problem

Step 3: Enter the number of sources and destinations

Step 4: Specify a unit cost from source to destination

Step 5: Specify the supply and demand amount

Step 6: Save the problem

Step 7: Select solve the problem

Step 8: Select automatic procedure to display the result and print the optimum result.

PROBLEM FOR PRACTICE

Solve the following transportation problem using TORA (MINIMIZATION)

| SOURCE | DESTINATION | | | SUPPLY |
|--------|-------------|---|----|--------|
| | A | B | C | |
| 1 | 2 | 7 | 4 | 5 |
| 2 | 3 | 3 | 1 | 8 |
| 3 | 5 | 4 | 7 | 7 |
| 4 | 1 | 6 | 2 | 14 |
| DEMAND | 7 | 9 | 18 | |

RESULT: Solution for a transportation problem using TORA was arrived.

VIVA-VOCE QUESTIONS

1. Define SPSS
2. What is Descriptive statistics?
3. Define Parametric Test
4. Define Non Parametric Test
5. Give Examples for Parametric test
6. Give Examples for Non-Parametric test
7. What is correlation?
8. What is regression?
9. What is forecasting?
10. Give examples for forecasting techniques?
11. Distinguish between data and information.
12. What is POM?
13. What is TORA?
14. Distinguish between PERT & CPM.
15. What is queueing theory?
16. Define balking and reneging
17. Classify queueing models
18. Define linear programming
19. Define assignment model
20. Define transportation model
21. Define portfolio
22. Define portfolio selection
23. Define revenue management
24. Define sensitivity analysis
25. Define capital budgeting
26. Define risk
27. Define return
28. Define EOQ
29. Define Inventory
30. Distinguish between correlation and regression/parametric and non-parametric test.
31. Define scheduling
32. Define sequencing.
33. What is factor analysis?
34. What is wilcoxon signed rank test?
35. What is discriminant analysis?

VIVA-VOCE QUESTIONS & ANSWERS

1. Define SPSS

SPSS stands for Statistical Package for Social Science.

2. What is Descriptive statistics?

Descriptive statistics are brief descriptive coefficients that summarize a given data set, which can be either a representation of the entire or a sample of a population. Descriptive statistics are broken down into measures of central tendency and measures of variability (spread). Measures of central tendency include the mean, median, and mode, while measures of variability include the standard deviation, variance, the minimum and maximum variables, and the kurtosis and skewness.

3. Define Parametric Test

Parametric tests assume underlying statistical distributions in the data. Therefore, several conditions of validity must be met so that the result of a parametric test is reliable. For example, Student's t-test for two independent samples is reliable only if each sample follows a normal distribution and if sample variances are homogeneous.

4. Define Non Parametric Test

Nonparametric tests do not rely on any distribution. They can thus be applied even if parametric conditions of validity are not met.

5. Give Examples for Parametric test

One sample t-test, 2-sample t-test, one way ANOVA

6. Give Examples for Non-Parametric test

Mann Whitney U test, Kruskal Wallis H test, one sample sign test, one sample wilcoxon, friedman test

7. What is correlation?

Correlation is usually defined as a measure of the *linear* relationship between two quantitative variables (e.g., height and weight).

8. What is regression?

A technique for determining the statistical relationship between two or more variables where a change in a dependent variable is associated with, and depends on, a change in one or more independent variables.

9. What is co-efficient of determination (r²)?

A statistical method that explains how much of the variability of a factor can be caused or explained by its relationship to another factor. Coefficient of determination is used in trend analysis. It is computed as a value between 0 (0 percent) and 1 (100 percent). The higher the value, the better the fit. Coefficient of determination is symbolized by r² because it is square of the coefficient of correlation symbolized by r. The coefficient of determination is an important tool in determining the degree of linear-correlation of variables ('goodness of fit') in regression analysis.

10. What is forecasting?

A planning tool that helps management in its attempts to cope with the uncertainty of the future, relying mainly on data from the past and present and analysis of trends. Forecasting starts with certain assumptions based on the management's experience, knowledge, and judgment. These estimates are projected into the coming months or years using one or more techniques such as Box-Jenkins models, Delphi method, exponential smoothing, moving averages, regression analysis, and trend projection. Since any error in the assumptions will result in a similar or magnified error in forecasting, the technique of sensitivity analysis is used which assigns a range of values to the uncertain factors

11. Give examples for forecasting techniques?

Qualitative vs. quantitative methods, Average approach, Naive approach, Drift method, Seasonal naïve approach, Time series methods, Causal / Econometric forecasting methods, Judgmental methods.

12. Distinguish between data and information.

Data – collection of raw facts Information –processed data

13. What is POM?

Production and Operations Management

14. What is TORA?

Taha operations research alogarithm

15. Distinguish between PERT & CPM.

| Basis for Comparison | PERT | CPM |
|--------------------------------------|---|---|
| Meaning | PERT is a project management technique, used to manage uncertain activities of a project. | CPM is a statistical technique of project management that manages well defined activities of a project. |
| What is it? | A technique of planning and control of time. | A method to control cost and time. |
| Orientation | Event-oriented | Activity-oriented |
| Evolution | Evolved as Research & Development project | Evolved as Construction project |
| Model | Probabilistic Model | Deterministic Model |
| Focuses on | Time | Time-cost trade-off |
| Estimates | Three time estimates | One time estimate |
| Appropriate for | High precision time estimate | Reasonable time estimate |
| Management of | Unpredictable Activities | Predictable activities |
| Nature of jobs | Non-repetitive nature | Repetitive nature |
| Critical and Non-critical activities | No differentiation | Differentiated |
| Suitable for | Research and Development Project | Non-research projects like civil construction, ship building etc. |
| Crashing concept | Not Applicable | Applicable |

16. What is queueing theory?

Queueing theory is the mathematical study of waiting lines, or queues. A queueing model is constructed so that queue lengths and waiting time can be predicted. Queueing theory is generally considered a branch of operations research because the results are often used when making business decisions about the resources needed to provide a service.

17. Define balking , reneging and retrial.

Balking : When notified that they will have to wait in line, someone leaves the system instead.

Reneging : Someone gets tired of waiting, and leaves the system before starting service.

Retrial : Someone who left the system early (due to a busy signal, or balking, or reneging) tries again.

18. Classify queueing models

Queueing theory is the mathematical study of waiting lines, or queues. A queueing model is constructed so that queue lengths and waiting time can be predicted. Queueing theory is generally

considered a branch of operations research because the results are often used when making business decisions about the resources needed to provide a service.

19. Define linear programming

A mathematical technique for maximizing or minimizing a linear function of several variables, such as output or cost.

20. Define assignment model

In order to generate an assignment problem it is necessary to provide the number of jobs and machines and indicate whether the problem is a minimization or maximization problem. The number of jobs and machines do not have to be equal but usually they are. The assignment method is used to determine what resources are assigned to which department, machine, or center of operation in the production process. This method is used to allocate the proper number of employees to a machine or task, and the number of jobs that a given machine or factory can produce.

21. Define transportation model

The Transportation Method of linear programming is applied to the problems related to the study of the efficient transportation routes i.e. how efficiently the product from different sources of production is transported to the different destinations, such as the total transportation cost is minimum.

22. Define portfolio

In finance, a portfolio is the combination of shares or other investments that a particular person or company has.

23. Define portfolio selection

The proper goal of *portfolio* construction would be to generate a *portfolio* that provides the highest return and the lowest risk. Such a *portfolio* would be known as the optimal *portfolio*. The process of finding the optimal *portfolio* is described as *portfolio selection*.

24. Define revenue management

Revenue management is the application of disciplined analytics that predict consumer behaviour at the micro-market levels and optimize product availability and price to maximize revenue growth.

25. Define sensitivity analysis

A *sensitivity analysis* determines how different values of an independent variable affect a particular dependent variable under a given set of assumptions.

26. Define capital budgeting.

Capital budgeting is the process in which a business determines and evaluates potential large expenses or investments. These expenditures and investments include projects such as building a new plant or investing in a long-term venture.

27. Define risk

A probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action.

28. Define return

A return, also known as a financial return, in its simplest terms, is the money made or lost on an investment. A return can be expressed nominally as the change in dollar value of an investment over time. A return can be expressed as a percentage derived from the ratio of profit to investment.

29. Define EOQ

Economic order quantity (EOQ) is the ideal order quantity a company should purchase for its inventory given a set cost of production, demand rate and other variables. This is done to minimize variable inventory costs, and the equation for EOQ takes into account storage, ordering costs and shortage costs.

30. Define Inventory

Inventory is an accounting term that refers to goods that are in various stages of being made ready for sale, including: Finished goods (that are available to be sold) Work-in-progress (*meaning* in the process of being made) Raw materials (to be used to produce more finished goods)

31. Distinguish between correlation and regression

| Basis for Comparison | Correlation | Regression |
|-------------------------------------|--|---|
| Meaning | Correlation is a statistical measure which determines co-relationship or association of two variables. | Regression describes how an independent variable is numerically related to the dependent variable. |
| Usage | To represent linear relationship between two variables. | To fit a best line and estimate one variable on the basis of another variable. |
| Dependent and Independent variables | No difference | Both variables are different. |
| Indicates | Correlation coefficient indicates the extent to which two variables move together. | Regression indicates the impact of a unit change in the known variable (x) on the estimated variable (y). |
| Objective | To find a numerical value expressing the relationship between variables. | To estimate values of random variable on the basis of the values of fixed variable. |

32. Define scheduling

Scheduling is the process of arranging, controlling and optimizing work and workloads in a production process. Companies use backward and forward scheduling to allocate plant and machinery resources, plan human resources, plan production processes and purchase materials.

33. Define sequencing.

Sequencing can be defined as the selection of an order for a series of jobs to be done on a number of service facilities (machine). The purpose of sequencing problems is to complete the job within the minimum possible time, keeping the minimum idle time of the machines (or services).

34. What is factor analysis?

Factor analysis is a technique that is used to reduce a large number of variables into fewer numbers of *factors*. This technique extracts maximum common variance from all variables and puts them into a common score.

35. What is wilcoxon signed rank test?

The *Wilcoxon signed-rank test* is a non-parametric statistical hypothesis *test* used to compare two related samples, matched samples, or repeated measurements on a single sample to assess whether their population mean *ranks* differ (i.e. it is a paired difference *test*).

36. What is discriminant analysis?

Discriminant Analysis is a statistical tool with an objective to assess the adequacy of a classification, given the group memberships; or to assign objects to one group among a number of groups. For any kind of Discriminant Analysis, some group assignments should be known beforehand.