JAIPURIA INSTITUTE OF MANAGEMENT

FPM

Term-1 (Batch 2022-23)

END TERM EXAMINATION, January -2023

Course Name	**Statistics for management**	Course Code	
Max. Time	**3 hours**	Max. Marks	**70**

INSTRUCTIONS:

1. Answer all questions.
2. For the end term exam students can use MS-Excel and/or SPSS to solve the questions. They are also required to write the Answer to all the questions on the answer sheet (can be a separate word file) and submit the supporting output file from MS-Excel and/or SPSS as one zip file.

Q-1 **2*7.5=15 Marks**

a. 12, 8, 20, 2, 14, 10, 15, 6, 9 and 4 car accidents per week were recorded during peak traffic hours in a city throughout ten weeks. Are the rate of accident remained consistent over this 10-week period?
b. A domestic airline operates several flights from four main Indian airports: (a) New Delhi, (b) Mumbai, (c) Bangalore, and (d) Hyderabad. 40%, 25%, 25%, and 10% of flights are operated from New Delhi, Mumbai, Bangalore, and Hyderabad, correspondingly. The proportion of delayed flights at these four airports are 10%, 8%, 7%, and 6%. What is the probability that a delayed flight originated from the Bangalore airport?

Q-2 **2*7.5=15 Marks**

The average Intelligence Quotient (IQ) of Indians is 82, as determined by IQ Research based on a study conducted by Professor Richard Lynn, a British Professor of Psychology, utilising data gathered from 2002 to 2006. The calculated population IQ standard deviation is 11.03 Based on a survey of 80 Indians, the average IQ was judged to be 84.

(a) Conduct a suitable hypothesis test at a = 0.05 to verify IQ Research's assertion (that average IQ of Indians is 82).

(b) According to the Ministry of Education, the IQ is more than 82. If the real IQ (mean of the population) of Indians is 86, determine the Type II error and the statistical power of the hypothesis test.

Q-3 **10 Marks**

A study says that Mondays are the most popular day of the week for coffee consumption. The sample of 50 coffee users yielded a mean difference of 14 millilitres and a standard deviation of

8.5 millilitres. Conduct an appropriate hypothesis test at a = 0.1 to verify the assumption that on Mondays, individuals consume 10 ml more coffee on average than on other days of the week.

Q-4 **2*10= 20 Marks**

In a pretest, respondents were asked to express their preference for an outdoor lifestyle using a 7-point scale: 1 - not at all preferred, to 7 - greatly preferred (V1). They were also asked to indicate the importance of the following variables on a 7-point scale: 1 -not at all important, to 7 -very important. V2 - enjoying nature V3 -relating to the weather V4 - living in harmony with the environment V5 - exercising regularly V6 -meeting other people The sex of the respondent (V7) was coded as 1 for females and 2 for males. The location of residence (V8) was coded as: 1 - midtown/downtown, 2 -suburbs, and 3 - countryside. The data obtained are given in the "***DATA-Q-4.xls***". Using a SPSS, please answer the following questions. In each case, formulate the null and the alternative hypotheses and conduct the appropriate statistical test(s).

a. Does the mean preference for an outdoor lifestyle exceed 3.0?

b. Does the mean importance of enjoying nature exceed 3.5?

c. Does the mean preference for an outdoor lifestyle differ for males and females?

d. Does the importance attached to V2 to V6 differ for males and females?

e. Do the respondents attach more importance to enjoying nature than they do to relating to the weather?

f. Do the respondents attach more importance to relating to the weather than they do to meeting other people?

g. Do the respondents attach more importance to living in harmony with the environment than they do to exercising regularly?

h. Does the importance attached to V2 to V6 differ for males and females if these variables are treated as ordinal rather than interval scaled?

i. Do the respondents attach more importance to relating to the weather than they do to meeting other people if these variables are treated as ordinal rather than interval?

j. Which of the above stated variable follows a normal distribution?

Q-5 **2*5=10 Marks**

Use the data on body weight of patients and their treatment cost provided in the data file "**Hospital.xlsx**" and answer the following questions:

a. Is there a statistical evidence to support that the cost of treatment and body weight are related? Support your answer with all necessary tests.

b. Interpret the value of the coefficient of weight in the model developed in question 1. What will be average difference in cost of treatment for patient aged 50 and patient aged 51?

c. Is it possible to conclude that a patient weighing 50 kg is likely to spend at least INR 500 more than the one weighing 49 kg at 90% confidence level?

d. At the time of admission, a patient's body weight is 50 kg. At 95% confidence level, what will be the maximum cost of treatment for this patient?

e. The hospital is planning to introduce package price for the treatment and they would like to charge INR 3,00,000 for the patients weighing 50 kg. That is, the patient is charged INR 3,00,000 irrespective of the actual treatment cost. What is the probability that the treatment cost is likely to exceed the package price?