

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)**

CLASS: MBA
BRANCH: MBA

SEMESTER : III
SESSION : MO/2025

SUBJECT: MT532 DECISION SCIENCE FOR BUSINESS MODELING

TIME: 3 Hours

FULL MARKS: 50

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

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| | CO | BL |
| Q.1(a) Discuss different measures of central tendency along with their merit and demerits. Discuss importance of central tendency and measure of dispersion in Decision making. | [5] | 1 2 |
| Q.1(b) The following data concerns return from equity stocks of ITC and HUL | [5] | 1 3 |

Period		2020	2021	2022	2023	2024	2025
Return (in %)	ITC	15%	20%	16%	22%	19%	24%
	HUL	12%	13%	15%	14%	16%	15%

- (a) Calculate mean and standard deviation of the returns of ITC and HUL Stock
(b) Compute the coefficient of variation for the return of two stocks and comment on them.
- Q.2(a) In trivariate distribution $r_{12} = 0.8$, $r_{23} = 0.6$, $r_{13} = 0.6$, Compute (a) $r_{12.3}$ (b) $r_{23.1}$ [5] 2 2
Q.2(b) Cost accountants often estimate overhead based on the level of production. At the Standard Knitting Co., they have collected information on overhead expenses and units produced at different plants, and want to estimate a regression equation to predict future overhead. [5] 2 4

Unit	5	6	7	8	9	10	11	12	13	14
Overhead	10	12	15	16	17	19	20	22	24	25

- (a) Develop the regression equation for the cost accountant.
(b) Predict overhead when 15 units are produced.
(c) Calculate the standard error of estimate.
- Q.3(a) Explain probability mass function and probability density function with some examples. [5] 3 2
Q.3(b) Tata Motor supplies a rear axle for Postal service mail trucks. These axles must be able to withstand 80000 pounds per square inch in stress tests, but an excessively strong axle raises production costs significantly. Long experience indicates that the standard deviation of the strength of its axles is 4000 pounds per square inch. The Manufacturer selects a sample of 100 axles from production, tests them, and finds that the mean stress capacity of the sample is 79600 pounds per square inch. [5] 3 3
(a) Formulate the null and alternate hypothesis (b) If manufacturer uses a significance level of 0.05 in testing, will the axles meet his stress requirements?
- Q.4(a) Discuss multivariate analysis and its techniques along with its application. [5] 4 2
Q.4(b) Differentiate between Principal Component Analysis (PCA) and Common/Exploratory Factor Analysis (CFA / EFA). [5] 4 3
- Q.5(a) Discuss similarities and difference between multiple regression analysis (MRA) and structure equation modelling (SEM). [5] 5 2
Q.5(b) Write down various applications of SEM to decision making problems. [5] 5 4