The LNM Institute of Information Technology, Jaipur
Department of Mechanical-Mechatronics Engineering
Mid-term Examination

Session : Odd Semester (2018-19)
Department : MME
Max. Marks : 50
Subject: Industrial Engineering & Management
Time : 90 mins
(Date: 27/09/2018: 2.30 pm to 4.00 pm)

Instructions :
i. *All questions are compulsory*
ii. *Use of Non-Programmable calculators is allowed*

Q.1 A solicitors firm employs typists on hourly piece rate basis for their work. There are five typists and their charges and speeds are different. According to an earlier understanding only one job is given to one typist and the typist is paid for full hour even if he works for a fraction of an hour. Find the least cost allocation for the following data.
(6 marks for problem formulation + 12 marks for solution)

Typist	Rate/hour	No. of pages typed/hour
A	5	12
B	6	14
C	3	8
D	4	10
E	4	11

Job	No. of pages
P	199
Q	175
R	145
S	298
T	178

Q.2 Obtain the IBFS for following transportation problem using VAM. Obtain an optimal solution by MODI method. (5 marks for IBFS by VAM + 5 marks for optimum solution)

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

Q.3 Weekly demands of a motorcycle by a retailer are given in the Table below. Find the forecast for 13th, 14th, 15th, and 16th weeks using linear regression analysis.

Week	1	2	3	4	5	6	7	8	9	10	11	12
Demand	420	450	460	420	500	550	480	520	610	570	600	590

If actual demands for 13th, 14th, 15th and 16th are 645, 664, 682, and 702, respectively, Find MAD, MAPE, and MSE for linear forecasting in this case.
(Initial table 2 marks + calculation of a, b, and demands for 13, 14, 15, and 16 week: 8 marks + calculation of MSE, MAD, MAPE: 6 marks)

Q.4 List stages in product design (2 marks). **Explain the concept of product life cycle** (4 marks).

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