

END SEMESTER EXAMINATION

November/December-2019

PAPER CODE FB-103

DECISION SCIENCE

Time: 3:00 Hours

Max. Marks : 60

- Note :** (i) Attempt any five questions out of seven.
(ii) Each question carry equal marks.
(iii) z, t and chi-square tables are attached with the question paper.
(iv) Use of simple calculator is allowed.

Q.1[a] A software testing company has three software testing experts. The company wants three software to be tested. The testing team head of the company, after studying carefully the software to be tested estimates the CPU time in hours required by the experts for the software testing as follows:

		Software		
		A	B	C
Testing Experts	1	27	12	20
	2	19	18	20
	3	24	14	17

Assign the testing experts to the software in such a way that the total CPU time is minimum.

[b] Explain coefficient of variation (CV) and using the data of firm A and B find the more stable firm in terms of shares values.

Price of share A(X)	700	675	725	625	650	700	650	50	700	625	650
Price of share B(Y)	550	600	575	550	650	600	600	550	525	625	600

Q.2[a] Find the initial basic feasible solution using Vogel approximation (VAM) method of the following transportation problem and also formulate the problem as a LPP model to minimize the total transportation cost.

	P	Q	R	S	Supply
A	2	3	11	7	6
B	1	0	6	1	1
C	5	8	15	9	10
Demand	7	5	3	2	

[b] Explain Transportation Problem and Assignment Problem with the problem with the help of suitable examples.

Q.3[a] From the data of sales and purchase of a departmental store given below find:

- (i) Regression coefficients.
- (ii) The two regression equations
- (iii) Use the above equation to predict the sales if purchase is 83.
- (iv) Calculate correlation coefficient and interpret the result.

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

[b] Solve the following LP Problem

Maximize $Z = 2x_1 + x_2 + 3x_3$

Subject to Constraints

$x_1 + x_2 + 2x_3 \geq 5$

$2x_1 + 3x_2 + 4x_3 = 12$

$x_1, x_2, x_3 \geq 0$

Q.4[a] In a random arrangement of the letters of word 'ENGINEERING' find the probability that all the vowels always occur together.

[b] A research company has designed three different system to clean up oil spills. The following table contains the results measured by how much surface area (in square meters) is cleared in one hour. The data were found by testing each method in several trials. Are the three system equally effective? Given $(F_{(2,12)}(0.05) = 3.88)$

System	Surface area cleared in one hour							
System A	55	60	63	56	59	55	-	-
System B	57	53	64	49	62	-	-	-
System C	66	52	61	57	-	-	-	-

Q.5[a] The owner of metro sports wishes to determine how many advertisements to place in selected three monthly magazines A, B and C. His objective is to advertise in such a way that total exposure to principal buyers of expensive sports good is maximized. Percentage of readers for each magazines are known. Exposure in any particular magazine is the number of advertisements placed multiplied by the number of principle buyers. The following data may be used:

Magazine	A	B	C
Readers	1 lakh	0.6 lakh	0.4 lakh
Principal Buyers	20%	15%	8%
Cost of Advertisements	8000	6000	5000

The budgeted amount is at most Rs. 1 lakh for the advertisements. The owner has already decided that magazine A should have no more than 5 advertisements and that B and C each have at least 80 advertisements. Formulate an LPP model for the problem.

[b] The demand for a particular commodity (in pieces) in a departmental store was found to vary from day to day. In a sample study the following information was obtained:

Days	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
Demand	500	550	525	530	490	560

Test the hypothesis that the number of pieces demanded on the day of the week.

Q.6[a] In a sample of 1,000 people in Maharashtra, 540 are rice eaters and rest are wheat eaters. Can we assume that both rice and wheat are equally popular in this state, at 1% level of significance? (Use Large Sample Test, the significant value of z at 1% level of significance is 2.58).

Q.6[b] Below are given the gain in weights (in kgs) of pigs fed on two food stuff A and B

Gain in weight

Diet A: 25, 32, 30, 34, 24, 14, 32, 24, 30, 31, 35, 25, 26

Diet B: 44, 34, 22, 10, 47, 31, 40, 30, 32, 35, 18, 21, 35, 29, 22

Test, if the two diets differ significantly as regards their effect on increase in weight.

Q.7 Write short note on (any five) the following:

- (i) Opportunity loss matrix
- (ii) Parametric and Non-Parametric tests.
- (iii) Sensitivity Analysis.
- (iv) Simulation and its applications in business.
- (v) Interval Estimation Vs point estimation.
- (vi) LPP and its Assumptions
- (vii) Normal Distribution and Poisson Distribution.