

- (1) All questions are compulsory.
- (2) Each question carries the same marks.
- (3) Only simple calculators are allowed.

Q1 Attempt any 3 sub questions out of 5.

(15)

- (a) Define population, sample, parameter and statistics with example.
- (b) Illustrate redundancy in LPP.
- (c) Define type -I error and type-II error.
- (d) Define Present value, future value, immediate annuity and annuity due.
- (e) Define risk and measuring parameters.

Q2 Attempt any 3 sub questions out of 5.

(15)

- (a) Define Beta with formula.
- (b) Define sharpe's optimal portfolio.
- (c) Suppose you flip two coins 100 times. The results are 20HH, 27HT, 30TH and 23TT. Are the coin fair? Test at 5% significance level. ($F_{3, 0.05}^2 = 7.815$)
- (d) Define CPM and PERT.
- (e) The difference between the simple interest and compound interest on a sum of money at 4% p.a. for 2 years is 45. Find the sum.

Q3(a) Shradha hotels, a large chain of hotels is trying to decide whether to convert more of its rooms to non-smoking rooms. In a random sample of 400 guests last year, 166 had requested non-smoking rooms. This year 205 guests in a sample of 380 preferred the non-smoking rooms. Would you recommend that the hotel chain convert more rooms to non-smoking? Support your recommendation by testing the appropriate hypothesis at 0.01 level of significance. (Z_{tab} at 0.01 l.o.s=2.33)

(7)

(b) Old machines can be brought at Rs. 2 lakhs each and new machines at Rs. 5 lakhs each. The old machine produce 3 components / week while the new machine produce 5 components / week each component being worth Rs. 30,000. A machine (New or old) costs Rs. 1 lakhs /week to maintain. The company has only Rs. 80lakhs to spend on machines. How many of each kind should the company buy to get a profit of more than Rs. 5 lakhs/ week. Assume that the company cannot house more than 20 machines. (Formulate only)

(8)

OR

Q3 (a) A firm has available 240, 370 and 180 kg of wood, plastic and steel respectively. The firm produces two products A and B. Each unit of A requires 1,3 and 2 kg of wood, plastic and steel respectively. The corresponding requirements for each unit of B are 3,4 and 1 respectively. If A sells for Rs. 4 and B for Rs. 6, determine how many units of A and B should be produced in order to obtain the maximum gross income. Solve Using the simplex method.

(15)

Q4 (a) A mother left Rs. 15,24,600 for her son and daughter who are 16 and 15 years old. The sum is to be divided and put into an investment giving 10% p.a. compounded interest, such that both will get the same amount when each is 18 years old. How will you divide the sum? (7)

(b) A machine costs a company Rs 64,000 and its effective life is estimated to be 10 years . A sinking fund is created for replacing the machine at the end of its effective life when its scrap realizes a sum of Rs. 4,000 only. Calculate the amount which should be provided every year for sinking fund if it accumulates at compound interest at 8% per annum.

(8)

OR

Q4(a) Mr. Prabhakar Naik has borrowed a sum of Rs. 60,000 from a person at 6% p.a and is due to return it back in 4 monthly instalments. Find the EMI he has to pay and also prepare the amortization table of repayment. (15)

Q5(a) Consider the following table of project details. (7)

Activity	1-2	2-3	2-4	2-5	3-10	4-6	4-7	5-9	6-8	7-9	8-9	9-11	10-11	11-12
Duration	2	3	4	2	4	2	4	4	2	5	3	2	3	2

- (i) Draw the network diagram.
- (ii) Find CPM.

(b) Calculate Beta for the following security. (8)

Year	1	2	3	4	5	6	7	8	9	10
Return on security(R_i %)	12	18	20	8	11	16	12	13	10	10
Return on market portfolio(R_m %)	15	20	22	15	14	20	10	10	12	12

OR

(a) The following information is available with respect to Jindal Ltd and Special Ltd.

Jindal Ltd		Special Ltd	
Return (%)	Probability	Return (%)	Probability
250	0.3	150	0.2
200	0.5	130	0.3
100	0.2	60	0.1

If you were to invest 1,00,000 in any one of the above companies, which company would you prefer? (7)

(b) For the given data. (8)

- (i) Construct the project network.
- (ii) Find the expected duration and variance of each
- (iii) Find CPM

Activity	Immediate predecessor(s)	Duration (week)		
		a	m	B
A	-	5	6	7
B	-	2	3	10
C	-	2	5	8
D	B	1	3	2
E	C,D	2	2	7
F	A	1	6	9
G	F,D	4	5	5
H	C,D	4	4	9
I	G	2	5	13
J	E	3	4	5
K	I	2	3	9