

MN3AGT

Time : 2 hours .

Marks: 60

## Instructions

1. All questions are compulsory.
2. Only simple calculators are allowed.
3. Figures to the right indicate full marks.

**Q1. (a) Define following with examples (4)**

- (i) Alternate hypothesis
- (ii) Type- II error.

**(b) Solve following Linear Programming Problem(LPP) by graphical method (6)**

$$\text{Maximize } Z = 18x_1 + 30x_2$$

Subject to

$$x_1 + x_2 \leq 300$$

$$x_1 + 2x_2 \leq 400$$

$$x_1 \leq 200$$

$$x_1, x_2 \geq 0$$

- (c) A random sample 250 piston rings was collected from a manufacturing process and it was found that average diameter of them was 3.2 cm with a standard deviation of 1.15 . The manufacturer claimed that the average diameter of a ring is 3.5cm. Carry out testing of hypothesis to test the manufacturers' claim at 5% l.o.s. (5)**  
 (z-value from standard normal table at 5% l.o.s. = 1.96)

OR

**Q1. (a) Explain the following with examples (4)**

- (i) Population and sample
- (ii) Infeasible solution in graphical method of LPP

- (b) Raj Steel manufacturing company produces two types of steel models X and Y . Model X makes a contribution of Rs. 50 per unit and model Y makes a profit contribution of Rs. 30 per unit. Raw materials R1 and R2 are required for production . 1 unit of X requires 2 kg of R1 and 4 kg of R2. 1 unit of Y needs 5 kg of R1 and 3 kg of R2. Also X and Y needs 5 labor hrs. and 2 labor hrs. per unit respectively . At least 18 kg of R1 has to be used daily and maximum 20 kg .of R2 is available per day. Formulate the problem as LPP. (6)**

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- (c) Two independent samples were collected to study the effect of two weight loss medicines A and B. The first sample of 70 clients using medicine A shows average weight loss of 12.5 kg with standard deviation of 5. The second sample of 100 clients using medicine B shows average weight loss of 10.5 kg. with standard deviation of 3. Test the hypothesis that both the drugs shows equal weight loss on an average using 10% I.o.s.  
(z-value from standard normal table at 10% = 1.64) (5)

- Q2. (a) Explain with examples (4)  
 (i) Sinking fund  
 (ii) Annuity Due

(b) A company has two alternatives X and Y for investment. The future cash flows from both the alternatives are as –

Year	Alternative X	Alternative Y	(6)
1	20000	25000	
2	22000	24000	
3	25000	25000	
4	28000	30000	
5	32000	35000	

The company can invest Rs.100000 today. If the discounting rate is 8% , suggest which alternative is better on the basis of NPV.?

- (c) Mr. Sethi deposits Rs.6000 in a bank for 8 years at the end of every year at the interest rate of 9% Calculate the sum accumulated at the end of 8 years. (5)

OR

- Q2. (a) Explain the following with examples (4)  
 (i) Amount of annuity and Term of Annuity  
 (ii) Present value and Future value

- (b) An investor wants to invest in a Wending machine which can give future incoming Cash flows as (6)

Year	Cash flow (Rs.)
	10000
1	11000
2	11000
3	10000
4	12000
5	12000
6	18000
7	15000
8	18000

If the investor can invest Rs. 150000. Is the project acceptable to him if discounting rate is 6% ?

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- (c) What will be the compound interest and sum accumulated (5)  
on Rs. 60000 for 5 years at 10% interest if interest is compounded –  
(i) annually,  
(ii) half-yearly ?

Q3 . (a) Give rules for construction of a network diagram. (3)

(b) The following information is available on Alfajet Ltd. And Betajet Ltd (6)

Alfajet Ltd.		Betajet Ltd.	
Returns(%)	Probability	Returns	Probability
210	0.3	300	0.3
200	0.2	250	0.4
150	0.3	220	0.1
250	0.2	100	0.2

If we want to invest in any one of the above two companies, which is preferable option for investment? (Use standard deviation method)

(c) From the following information, calculate Beta of security.

Year	Returns on security (%)	Return on market portfolio (%)	(6)
1	15	18	
2	15	15	
3	16	16	
4	10	14	
5	15	20	
6	18	18	

OR

Q3 (a) Explain (3)

- (i) Objectives of portfolio management  
(ii) Beta on security

(b) You are considering purchase of shares of a company .You have (6)  
expectations regarding the price of the share after 2 years as-

Rate of return(%)	Probability
80	0.1
120	0.2
100	0.2
150	0.2
180	0.3

Find expected rate of return and standard deviation of rate of return.

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- (c) If a person wants to get Rs. 80000 after 4 years with interest rate 6% , (6)  
 (i) how much money should he invest today if interest is compounded annually?  
 (ii) what amount he should deposit every year as annuity immediate?

- Q4 .(a) Define (i) Activity (3)  
 (ii) Dummy activity  
 (iii) Critical path

- (b) Draw network for the following project and find the critical path (7)

Activity	Duration( days)
1-2	6
1-3	8
1-4	5
2-3	6
2-5	8
3-4	7
3-6	8
4-6	5
5-6	3

- (c) Mr. Narayan is 48 years old today. He wish to create a sinking fund (5)  
 which will be equal to the amount of Rs. 20,00000 after 12 years for his post retirement life .He will get money of Rs.250000 as his retirement benefits. What amount he should keep aside annually so that he will get the required amount if interest rate is 11%?

OR

- Q4 . (a) Soham deposits the sum of Rs. 15000 for 4 years at end of every year in a bank offering compound interest of 8% What will be the accumulated sum? (3)

- (b) A project consists of 7 activities as follows- (7)

Activity	Duration (in weeks)
1-2	6
1-3	6
1-4	5
2-3	4
2-5	4
3-7	3
4-6	2
5-7	1
6-7	3

Draw project network and find critical path.

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- (c) A company is investing in a Xerox machine today costing Rs. 500000 and its (5) expected functional life is around 15 years . A sinking fund is created for replacing the machine at the end of its functional life time when its scrap realizes a sum of Rs. 5000 . Calculate the amount which should be saved every year for the sinking fund if interest rate is 7 % .
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