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59674

SOLUTIONS

Examination: F.Y.B. Com. (CBCGSS) (R-2018-19) Semester I

Subject : Mathematical and Statistical Techniques I

Max Marks: 100

Time: 3 Hrs.

SECTION I

Q.1 Attempt any four from the following(5 marks each)

a)

Total Dividend recd.	=(R.D.*F.V.*No. of shares)/100
No. of shares	=(62.40*100)/(6*10)
	=104

b)

Amt. recd. on the sale of one share	=55-(0.5*55)/100
	=Rs. 54.725
Net Amt. rec.	=Rs. 21890

c)

Purchase Price	=210.47
No. of units Purchased	=85.523
Redemption. Price	=290.50
Amt. recd after redemption	=24844.4315
Total Gain	=Rs. 6844.432
ROR	=38.025%

d)

Purchase Price	=66.11
No. of units Purchased	=453.789
Total dividend recieved	=453.789*5=2268.945

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e)

Month	Amount	NAV (Rs)	Pur. Price per unit (Rs)	No. of units
1	4000	33.26	33.99837	117.6526923
2	4000	28.25	28.87715	138.5178246
3	4000	35.57	36.35965	110.012048
4	4000	38.45	39.30359	101.7718738
5	4000	44.32	45.3039	88.2926116
Total	20000			556.2470503
	AAC=	Rs.35.95525		

Q2. ATTEMPT ANY FOUR (05 MARKS EACH):

a) No.of ways= ${}^6P_6$=720

No. of words starting with D = $1*{}^5P_5$=120

b)No.of ways= ${}^6C_5*{}^4C_0$= 6

c)

A(0,4) B(6,0) C(0,8) D(4,0)

Feasible region bounded by OAPD

Z at A=4

Z at O=0

Z at D=4

Z at P(3,2) = 5

Z is max at P

d)A(0,1) B(4,0) C(0,3) D(1,0)

Feasible region bounded above by BPC

Z at B=28

Z at C=3

Z at P(8/11,9/11) = 65/11=5.9

Z is min at C

e)

No.of units of F1=x

No. of units of F2 =y

Min z = 4x+8y

$200x+1000y \geq 4000$

$2x+2y \geq 50$

$40x+20y \geq 1400$

$x,y \geq 0$

SECTION II

Q3. Attempt any FOUR of the following: (5 marks each)

a) Theory

b) Mode = 30

Age (x)	10	20	30	40	50	
No. of Persons	6	11	20	15	8	60
fx	60	220	600	600	400	1880

Mean = 1880/60= 31.33

c)

Marks	0-20	20-40	40-60	60-80	80-100	Total
No. of Students	23	37	50	24	16	150
Cf	23	60	110	134	150	

N/4= 37.5

3N/4= 112.5

$Q_1 = 20 + (37.5-23)/37*20 = 20 + 7.838 = 27.84$

$Q_3 = 60 + (112.5-110)/24*20 = 60 + 2.08 = 62.08$

Coeff of QD= (62.08-27.84)/ (62.08+27.84) = 34.24/89.92 = 0.38

d)

Weights in kgs.	5-10	10-15	15-20	20-25	25-30	
No. of children	4	8	12	10	6	40
x	7.5	12.5	17.5	22.5	27.5	
fx	30	100	210	225	165	730
fx*x	225	1250	3675	5062.5	4537.5	14750

(4)

Mean = 730/40 = 18.25

SD = $\sqrt{(14750/40 - 18.25^2)} = \sqrt{368.75 - 333.0625} = \sqrt{35.6875} = 5.97$

e) Combine mean= 14000/300 = 46.67

CV of Group I = 10

CV of Group II = 6.67

Group II is more consistent

Q4. Attempt any FOUR of the following: (5 marks each)

a) $P(A \cup B) = \frac{10}{20} + \frac{6}{20} - \frac{3}{20} = \frac{13}{20}$

b) $P(A') = 1/3$, $P(A \cup B) = \frac{2}{3} + \frac{3}{5} - \frac{6}{15} = \frac{13}{15}$

c) $E(x) = 3(1/8) + 4(3/8) + 5(3/8) + 6(1/8) = 4.5$ $= 12/8 = 1.5$

d) $P(A \cup B) = \frac{95}{125}$, $P(A \cap B^c) + P(A^c \cap B) = \frac{40}{125} + \frac{25}{125} = \frac{65}{125} = 13/25$

e) Theory.

Q5. Attempt any FOUR of the following:(5 marks each)

a) Explain the term 'Opportunity loss' in 'Decision theory'. How the optimal decision is obtained w.r.t. 'Opportunity loss'? (5)

Regret Value- It is defined as the amount of payoff lost by not taking the action with highest payoff under the observed state of nature. Regret is calculated after the state of nature hasoccurred. After the regret values are obtained the optimal decision is that which produces minimum opportunity loss/regret value.

b) Solve decision problem using i) Maximax ii) Maximin criteria (5)

Event → Action ↓	S_1	S_2	S_3	Max	Min
A1	5	10	18	18	5
A2	8	22	8	22	8
A3	**21**	**18**	**12**	**21**	**12Max**
A4	**30**	**7**	**19**	**30 Max**	**7**
			Optimal decision	A4	A3

5

c) Determine the best decision according to Minimax Regret criterion: (5)

Events↓ Action→	A	B	C
S1	10/15	12/13	25Max/0
S2	18/6	24Max/0	10/14
S3	25/5	30Max/0	20/10
Max OL	15	**13Min** 14	

Optimal decision by Minimax criteria: B

d) Decision using, EMV criterion (5)

	States of nature			
Action	E1	E2	E3	EMV
P	15	14	10	15X0.5+14X0.4+10X0.10 = 14.1
Q	13	15	12	13.7
R	**17**	**16**	**25**	**17.4 (MAX)**
Probability(E)	0.5	0.4	0.1	

Optimal decision by Max EMV: Action-R

e) Decision tree diagram- (5)

	Participation Level			
Type of Policy	High	Medium	Low	EMV
A	20	18	10	15.9
B	**15**	**30**	**20**	**21.25 MAX**
Probability	0.35	0.30	0.35	

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