UPES

## UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2018Semester – IIProgramme: B. Plan.Semester – IICourse Name: Statistical and Quantitative Methods in Planning-IIMax. Marks : 100Course Code: MATH 1007Duration : 3 HrsNo. of page/s: 02Semester – II

## **Instructions:**

Attempt all questions from **Section A** (each carrying 4 marks); attempt all questions from **Section B** (each carrying 8 marks); attempt **Section C** (each carrying 20 marks).

					Section A					
			(A		ons are col	npulsory	)			
1.	Explain the properties of correlation coefficient.							[4]	CO1	
2.	Define feasible solution, infeasible solution and basic feasible solution.								[4]	CO2
3.	Describe the components of decision making.							[4]	CO4	
4.	Write all the conditions to apply the ANOVA.							[4]	CO3	
5.	Discuss the properties and conditions for chi-square test.							[4]	CO3	
				are comp	ECTION I ulsory and	Q10 has				1
6.	Calculate	the coefficie	ent of corr	relation b	etween $x$ and $68$	nd y for th	e followi	ng data	[8]	CO1
	$\frac{x}{y}$ :		68 68	66	69	72	70	69		
7.	A stenographer claims that she can type at the rate of 120 words per minute. Can we reject her claim on the basis of 100 trials in which she demonstrates a mean of 116 words with a standard deviation of 15 words? Use 5% level of significance. (Given $Z_{0.05}=1.96$ )								[8]	CO3
8.	Find out t	the regression	n coeffici	ent of Y o	on X from t	he follow	ing data:		[8]	CO1
	Y	160	18	0	140	180	2	200		

9.	over the week. (			lei ule acc	idents are unit	ormly distributed	[8]	CO
	Days	Sun.			ed. Thu.	Fri. Sat.		
	No. of Acciden Use the graphica		_	8 20 following l		9 14		
	• •	$x. Z = 15x_1$		lonowing i				
	subject to the co	-	1 10002					
10.	$4x_1$							
	$3x_1$							
	-	$_{2} \le 200$					[8]	CO
10.	-	$x_2 \ge 0$					[0]	
	Define Basic solution and optimum basic feasible solution with an example.							
				SECTION				
	(Q)	11.A, Q11.	B are com	pulsory an	d Q12 has inte	ernal choices)		
11.A	extend either on equals the total opponent. In the changes hands. i) Write dow that the pl ii) What is th Charlie sh this situati	e or two f number o e event the vn a pay-o ayer holds he payoff f hows 1 fing	ingers and f extended at neither p ff matrix fo up one fing or Ruth if F ger and call	call out a fingers wi player's ca or this game ger and sho Ruth shows as out 3? W	number. The p ns that many ll matches the e (here the stra- uts 2). s two fingers an Vhat is the pay	ie simultaneously player whose call pennies from the total, no money tegy (1, 2) means nd calls out 4 and off for Charlie in	[10]	со
	7, 9and 18 unit shipped to four	ts per wee warehouses , respectiv s to warehouses	$\begin{array}{l} \begin{array}{c} & & \\ & & \\ & \\ & \\ & \\ & \\ & \\ & \\ & $	duct, resp and $D_4$ witransportation	ectively. These th requirement on costs per	oduction capacity e units are to be of 5, 6, 7 and 14 unit (in rupees) : Capacity 7		CO

	The three sam	ples below ha	ave been obtained	from normal population	ns with equal		
	variances. Tes	st the hypothe	sis at 5% level tha	t the population means	are equal:		
	8	3	7	12	,		
	1	0	5	9			
	7	7	10	13	13		
	1	4	9	12			
	11		9	14			
	(The table val						
	The following						
12	seeds (viz., A,	, B, C).		~		[20]	CO3
		А	В	С			
		20	18	25			
		21	20	28			
		23	17	22			
		16	25	28			
		20	15	32			
	Test at 5%	level of sign	ificance whether	the average yields of	land under		
	different varie	eties of seeds a	show significant d	ifferences.			
	Table value of	f F at 5% leve	el for $v_1=2$ and $v_2=$	12 is 3.88)			

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## **Instructions:**

Attempt all questions from **Section A** (each carrying 4 marks); attempt all questions from **Section B** (each carrying 8 marks); attempt **Section C** (each carrying 20 marks).

			S	ection A						
		(All		ns are co	mpulso	ry)				
1.	1.Explain Merits and limitations of rank correlation coefficient.									CO1
2.	2. Define Basic solution and optimum basic feasible solution.									CO2
3.	3. Describe the various environments for decision making.									CO4
4.	4. Write all the conditions to apply the ANOVA.								[4]	CO3
5.	5. Discuss the applications of chi-square test.								[4]	CO3
	(Q6, Q7, Q	8, Q9 are		CTION lsory and		as inter	nal cho	ices)		
6.	Calculate the coefficient of correlation between Marks in Physics and Marks in Chemistry for the following data									CO1
	Marks in Physics   65   66   67   68   69   70   71     Marks in Chemistry   67   68   66   69   72   72   69								[8]	
7.	Ten objects are chosen at random from a large population and their weights are found to be in gms: 63, 63, 64, 65, 66, 60, 60, 70, 70, and 71. In the light of this									CO3
8.	Find out the regression of X 2	coefficien	<u>_</u>	n X from	the follo	owing da	ata:		[8]	CO1

9.	DaysSun.Mon.Tue.Wed.Thu.Fri.Sat.No. of births4682194						101	CO				
9.	Days	S	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.		Sat.	[8]	CO
	No. of births		1	6	8	2	1	9		4		
	(Given $\Psi^2_{6, 0.0}$	<sub>05</sub> =12.59)	)									
	Use the graph				e follow	ving LP p	oroblem					
	Max. $Z = 3x_1 + 2x_2$ Subject to the constraints											
	-	$4x_1 + 6x_2$										
			$_{2} \leq 50$									
		$3x_1 \le 18$										
10.		$5x_2 \le 20$									[8]	CO
		$x_1, x_2 \ge 0$	J									
		OR										
	Define feasible solution, infeasible solution and basic feasible solution with an											
	example.											
	example.											
	example.				SEC	FION C						
		(Q11.A,	Q11.I	B are co		FION C y and Q	012 has in	nterna	l choi	ices)		
		(Q11.A,	Q11.I	3 are co			912 has in	nterna	l choi	ices)		I
	( A producer o	f boats ]	has es		mpulsor	y and Q	-			-		
	A producer o particular kind	f boats d of boat	has es	timated	mpulson	ry and Q	istributio	ns of c	lemar	nd for a		
11.4	A producer o particular kind No.	f boats ]	has es		mpulsor	y and Q	istributio			nd for a		
11.A	A producer o particular kind No. Demanded	f boats d d of boat 0	has es	timated	the foll	y and Q	istributio	ns of c	lemar 6	nd for a	[10]	СО
11.A	A producer o particular kind No. Demanded Probability	f boats d of boat 0 0.14	has es :: 1 0.27	timated 2 0.27	the foll 3 0.2	y and Q owing di 4 18 (	istribution	ns of c 5 0.04	lemar 6 0	nd for a	[10]	CO
11.A	A producer o particular kind No. Demanded	f boats d d of boat 0 0.14 t him Rs	has es :: 1 0.27 s. 7000	timated 2 0.27 0 and he	the foll 3 0.2 sells the	y and Q owing di 4 18 (C em for R	istribution 4 0.09 s. 10000	ns of c 5 0.04 each. A	lemar 6 0 Any t	nd for a	[10]	co
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as	f boats d d of boat 0 0.14 ot him Rs must be to maxin	has es :: 1 0.27 s. 7000 dispos mize h	timated 2 0.27 0 and he sed off f is expect	the foll 3 0.1 sells the or Rs. 60 ted prof	y and Q owing di 4 18 (0 em for R 000 each it?	istribution 	ns of $c$ 5 0.04 each. A any bo	lemar 6 0 Any t ats sh	nd for a .01 boat that hould be	[10]	CO
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h	f boats l d of boat 0 0.14 thim Rs must be to maxin as three	has es 1 0.27 s. 7000 dispos mize h produ	timated 2 0.27 0 and he sed off f is expection factor	the foll 3 0.1 sells the or Rs. 60 ted prof cilities S	by and Q owing dia 4 18 (1) 18 (1) 18 (1) 18 (1) 19 19 (1) 19 (1)	istribution 1 0.09 s. 10000 . How main $1$ $S_3$ with $1$	ns of c 5 0.04 each. A any bo produc	leman 6 0 Any b ats sh	nd for a .01 boat that hould be capacity	[10]	co
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12	f boats d d of boat 0 0.14 thim Rs must be to maxin as three units po	has es 1 0.27 s. 7000 dispos mize h produ er wee	timated 2 0.27 0 and he sed off f is expection fate ek of a	the foll 3 0.7 sells the or Rs. 60 ted prof cilities S product,	wing diamon $(4)$ owing diamon $(4)$ (18) ( $(4)(18)$ ( $(4)(18)$ ( $(4)$	istribution 1 0.09 10000 1  How matrix $1 \text{ S}_3 \text{ with } 1$ 1  ively. The second se	ns of c 5 0.04 each. A any bo produc	leman 6 0 Any b ats sh tion o its an	nd for a .01 boat that hould be capacity re to be	[10]	co
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for	f boats d d of boat 0 0.14 thim Rs must be to maxin as three units pour units pour	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses	timated 2 0.27 0 and he sed off f is expection fa- ek of a D <sub>1</sub> , D <sub>2</sub> ,	the foll the foll 3 0.1 sells the or Rs. 60 ted prof cilities S product, D <sub>3</sub> and I	owing di owing di 4 18 (0 18 (0 18 (0 18 (0 100 (0 1	istribution 0.09 s. 10000 . How main the second seco	ns of c 5 0.04 each. A any bo produc ese un ent of 7	leman 6 0 Any b ats sh tion o its an , 8, 1	nd for a .01 boat that hould be capacity re to be 0 and 5	[10]	CO
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for units per we	f boats l d of boat 0 0.14 thim Rs must be to maxin as three units pour wareh eek, resp	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses pective	timated 2 0.27 0 and he sed off f is expection fa- ek of a $D_1, D_2,$ ely. The	the foll the foll 3 0.7 sells the or Rs. 60 ted proficilities S product, D <sub>3</sub> and I e transp	ey and Q owing di owing di 4 18 ( $0em for R000$ each it? 1, S <sub>2</sub> and respecti $0_4$ with r ortation	istribution 1 0.09 10000 0.09 100000 100000 100000 100000 100000 1000000 10000000 1000000000000000000000000000000000000	ns of c 5 0.04 each. A any bo produc ese un ent of 7 er unit	leman 6 0 Any b ats sh tion o its an , 8, 1	nd for a .01 boat that hould be capacity re to be 0 and 5	[10]	co
11.A	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for	f boats d d of boat 0 0.14 thim Rs must be to maxin as three units pour units pour wareh eek, resp rries to w	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses pective vareho	timated 2 0.27 0 and he sed off f is expect ction factorial ek of a $D_1, D_2,$ ely. The uses are	the foll the foll 3 0.1 sells the or Rs. 60 ted prof cilities S product, D <sub>3</sub> and I e transp given ir	y and Qowing di $4$ $4$ $18$ $18$ $18$ $17$	istribution 1 0.09 s. 10000 . How main l S <sub>3</sub> with ively. The equirement costs per- per- costs per- per- costs per- costs per- cost	ns of c 5 0.04 each. A any bo produc ese un ent of 7 er unit	leman 6 0 Any b ats sh tion o its an , 8, 1 (in	nd for a .01 boat that hould be capacity re to be 0 and 5 rupees)	[10]	co
11.A 11.B	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for units per we between facto	f boats $1$ d of boat 0 0.14 thim Rs must be to maxin as three units pour wareh eek, resp ries to w D <sub>1</sub>	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses pective vareho	timated 2 0.27 0 and he sed off f is expection factorial ction factorial $D_1, D_2,$ ely. The uses are $D_2$	mpulsonthe foll30.1sells theor Rs. 60ted profcilities Sproduct,D3 and Ie transpgiven in $D_3$	y and Qowing di $4$ $18$ $18$ $18$ $100$ each $17$ <	istribution 1 0.09 s. 10000 . How may l S <sub>3</sub> with ively. The equirement costs per- powing tables D <sub>4</sub>	ns of c 5 0.04 each. A any bo produc ese un ent of 7 er unit	leman 6 0 Any b ats sh tion o its an , 8, 1 (in Capa	nd for a .01 boat that hould be capacity re to be 0 and 5 rupees)	[10]	
	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for units per we between facto	f boats $D_{1}$ d of boat 0 0.14 ot him Rs must be to maxin as three units pour wareh wek, resp ories to w D <sub>1</sub> 19	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses pective vareho	timated 2 0.27 0 and he sed off f is expect ction factorial expected a $D_1, D_2,$ ely. The uses are $D_2$ 30	mpulson   the foll   3   0.1   sells the   or Rs. 60   ted prof   cilities S   product,   D <sub>3</sub> and I   e transp   given ir   D <sub>3</sub> 50	y and Q owing di 4 18 (0 18 (0 18 (0) 100 each 11, S <sub>2</sub> and 11, S <sub>2</sub> and 12, S <sub>2</sub> and 13, S <sub>2</sub> and 14 (1) 14 (1) 1	istribution 1 0.09 s. 10000 . How main ively. The equirement costs pre- powing table $D_4$ 10	ns of c 5 0.04 each. A any bo produc ese un ent of 7 er unit	leman 6 0 Any b ats sh tion c its an 7, 8, 1 (in) Capa 8	nd for a .01 boat that hould be capacity re to be 0 and 5 rupees)	[10]	
	A producer o particular kind No. Demanded Probability Each boat cos is left unsold in stock so as A company h 8, 10 and 12 shipped to for units per we between facto	f boats $1$ d of boat 0 0.14 thim Rs must be to maxin as three units pour wareh eek, resp ries to w D <sub>1</sub>	has es 1 0.27 s. 7000 dispos mize h produ er wee ouses pective vareho	timated 2 0.27 0 and he sed off f is expection factorial ction factorial $D_1, D_2,$ ely. The uses are $D_2$	mpulsonthe foll30.1sells theor Rs. 60ted profcilities Sproduct, $D_3$ and Ie transpgiven in $D_3$	y and Q owing di 4 18 (0 em for R 000 each it? $1, S_2$ and respecti $0, respecti0, s_2 andthe follo$	istribution 1 0.09 s. 10000 . How may l S <sub>3</sub> with ively. The equirement costs per- powing tables D <sub>4</sub>	ns of c 5 0.04 each. A any bo produc ese un ent of 7 er unit	leman 6 0 Any b ats sh tion o its an , 8, 1 (in Capa	nd for a .01 boat that hould be capacity re to be 0 and 5 rupees)	[10]	со

	The three samples below variances. Test the hypotl 8 10 7 14			are equal:		
	11 (The table value of F at 5 The following table give	s 3.88)				
12.	seeds (viz., A, B, C).	В	С		[20]	CO3
	20	18	25			
	21	20	28			
	23	17	22			
	16	25	28			
	Test at 50 level of si	15	32	land under		
	Test at 5% level of sig different varieties of seed Table value of F at 5% le	land under				