

**JAH-1653**

Seat No. \_\_\_\_\_

**Second Year B. C. A. (Sem. III) Examination****November / December – 2012****303 - Statistics & Optimization Technique**

Time : 3 Hours]

[Total Marks : 70

**1 (a) Answer the following questions : 7**

- (1) \_\_\_\_\_ is an ideal average.
- (2) Find mean of  $1, \frac{1}{2}, \frac{1}{4}, 2, 1\frac{1}{4}, \frac{1}{6}$ .
- (3) State the empirical relationship between mean, median and mode.
- (4) 50% of the observation of a series are more than 82. Its median is \_\_\_\_\_.
- (5) List out the measure of dispersion.
- (6) Which measure of dispersion is ideal.
- (7) Quartiles divide a series into \_\_\_\_\_ equal part.
- (8) Define mean Deviation.

**(b) Attempt : (any two) 10**

- (1) Find the missing frequency from the following frequency distribution

$$n = 120, \bar{x} = 60.$$

<i>Class :</i>	10 – 30	30 – 50	50 – 70	70 – 90	90 – 110
<i>Freq. :</i>	17	$f_1$	32	$f_2$	19

- (2) Find mode :

Observation :	1	4	7	8-10	10-15	15-25	25-40	40-50
Frequency :	1	3	7	10	15	8	4	2

(3) Find standard deviation :

Class :	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Freq.:	2	6	12	16	22	18	14

**2** (a) Do as directed : **8**

- (1) What is regression ?
- (2) What is correlation coefficient ?
- (3) The value of  $r$  lies between \_\_\_\_\_ and \_\_\_\_\_.
- (4) Explain the difference between correlation and regression. **2**
- (5) Explain probable error. **2**
- (6)  $\sqrt{byx} \cdot \sqrt{bxy} = \underline{\hspace{2cm}}$

(b) Attempt : (any **two**) **10**

- (1) Find  $r$  using rank correlation method.

$x$ :	70	75	80	30	60	25	50	35	58	80
$y$ :	20	33	15	60	44	65	36	56	42	15

- (2) For the following set of data find  $y$  for  $x = 15$

$x$ :	13	16	14	11	17	9	13	17	18	12
$y$ :	6.2	8.6	7.2	4.5	9.0	3.5	6.5	9.3	9.5	5.7

- (3) Find Karl Pearson coefficient between  $x$  and  $y$ .

$x$ :	3	4	6	7	10
$y$ :	9	11	14	15	16

**3** (a) Answer the following :

- (1) Write mathematical model of linear programming problem. **3**
- (2) Write the full form of PERT and CPM. **1**

- (3) Explain slack variable and surplus variable. 3

OR

Explain Event and Activity.

- (b) Attempt : (any **two**) 10

- (1) Use the Simplex method to solve the following LPP problem.

$$\text{Max.} \quad Z = 3x_1 + 2x_2$$

subject to constraints :

$$x_1 + x_2 \leq 4$$

$$x_1 - x_2 \leq 2$$

$$\text{and } x_1, x_2 \geq 0$$

- (2) Draw the network diagram for the following activities :

Activity	A	B	C	D	E	F	G
Predecessor	—	—	—	A, B	C	D	E, F
Activity							

- (3) Solve the following LPP and find the optimum solution.

$$\text{Maximize} \quad Z = 100x_1 + 150x_2$$

$$\text{S to C :} \quad 5x + 2y \leq 180$$

$$3x + 3y \leq 135$$

$$y \leq 2x$$

$$\text{and } x, y \geq 0.$$

- 4 (a) Answer the following :
- (1) Write down the mathematical model of transportation problem. 3
  - (2) What is unbalanced transportation problem ? How can it be balanced ? 4
  - (3) What is degeneracy ? 1
- (b) Attempt the following : 10
- (1) Find optimum basic feasible solution of the following transportation problem.

	Destinations				Supply
	$D_1$	$D_2$	$D_3$	$D_4$	
$O_1$	19	30	50	10	7
$O_2$	70	30	40	60	9
$O_3$	40	8	70	20	18
Demand	5	8	7	14	34

- (2) Determine the optimum assignment schedule for the following :

	Jobs			
	$A$	$B$	$C$	$D$
$P_1$	41	72	39	52
$P_2$	22	29	49	65
$P_3$	27	39	60	51
$P_4$	47	50	48	52