



GAV-3353

Seat No. _____

B. C. A. (Sem. III) Examination

November / December - 2013

BCA-303 : Statistics & Optimization Technique
(New Course)

Time : 3 Hours]

[Total Marks : 70

1 (a) Answer the following questions : 8

- (1) _____ is an ideal average.
- (2) The mean of a series of 36 observations is 18.7 then find the sum of observations.
- (3) The value of S.D. is always _____.
- (4) Quartile divide a series into a _____ equal parts.
- (5) Define : Mean deviation.
- (6) Define : Class boundaries.
- (7) _____ mode of $-5, -7, -1, -2, -5, -5, 1, 2$.
- (8) $\bar{X} = 20, M = 18, Z =$ _____.

(b) Attempt : (any two) 10

- (1) The median of frequency distribution of marks of 400 students is 38.5. Find missing frequency.

Marks :	11-20	21-30	31-40	41-50	51-60	61-70	71-80
No. of obser.	42	38	f_1	54	f_2	36	32

(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
Frequency :	2	6	12	16	22	18	14

2 (a) Answer the following questions :

(1) What is regression ? 1

(2) If $r = -1$ then two variables are _____. 1

(3) $\sqrt{b_{xy} \cdot b_{yx}} = \underline{\hspace{2cm}}$. 1

(4) Explain probable error. 2

(5) What is correlation coefficient ? 1

(6) Define : Positive correlation. 1

(b) Attempt any two : 10

(1) Find coefficient of correlation from maths and accounts marks.

Marks	45	70	65	30	90	40	50	75	85	60
Maths										
Marks	35	90	70	40	95	40	60	80	80	50
Account										

Arithmetic mean of marks in maths and marks in account are 60 and 65 respectively.

(2) Obtain the two regression equations for the following.

Data :

A	23	43	53	63	73	83
B	05	06	07	08	09	10

(3) Find r using rank correlation method :

x	36	56	20	65	42	33	44	50	15	60
y	50	35	70	25	58	75	60	45	80	30

3 (a) Answer the following : 6

- (1) Write the full form of PERT and CPM.
- (2) Explain slack variable and surplus variable.
- (3) Explain event and activity.

(b) Attempt any two : 12

(1) Solve LPP using simplex method :

$$\begin{aligned} \max Z &= 6x + 4y \\ \text{subject to constraints} \end{aligned}$$

$$2x + 5y \leq 120$$

$$4x + 2y \leq 80$$

$$x, y \geq 0$$

(2) Draw the network diagram :

Activity:	A	B	C	D	E	F
Predecessor activity:	-	A	A	B,C	-	D,E

(3) Solve LPP using graphical method :

$$\begin{aligned} \max Z &= 6x_1 + 7x_2 \\ \text{subject to constraints} \end{aligned}$$

$$2x_1 + 4x_2 \leq 48$$

$$4x_1 + 2x_2 \leq 60 \text{ and}$$

$$x_1, x_2 \geq 0$$

- 4 (a) Answer the following questions :
- (1) Explain steps of Hungarian method. 3
 - (2) Explain the steps of optimal solution. 3
 - (3) What is Dummy operation ? 1
- (b) Attempt : (any two) 10
- (1) Find initial basic feasible solution by LCM.

	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>Supply</i>
<i>A</i>	1	2	1	4	30
<i>B</i>	3	3	2	1	50
<i>C</i>	4	2	5	9	20
<i>Demand</i>	20	40	30	10	

- (2) Find optimal solution.

	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₃	<i>D</i> ₄	<i>Supply</i>
<i>S</i> ₁	2	3	11	7	6
<i>S</i> ₂	1	0	6	7	1
<i>S</i> ₃	5	8	15	9	10
<i>Demand</i>	5	7	3	2	

- (3) Determine the optimum assignment schedule for the following.

	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>	<i>T</i>
<i>A</i>	85	75	65	125	75
<i>B</i>	90	78	66	132	78
<i>C</i>	75	66	57	114	69
<i>D</i>	80	72	60	120	72
<i>E</i>	76	64	56	112	68