(Please write your Exam Roll No.) Exam Roll No. 01414202012

END TERM EXAMINATION

THIRD SEMESTER [BCA] DECEMBER 2013

Paper Code: BCA201 **Subject: Mathematics-III (2011 onwards)**

Time : 3 Hours **Maximum Marks :75**

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit. Calculator is permitted.

Q1 (a) In a moderately asymmetrical distribution, the mode and mean are 32.1 and 35.4 respectively. Find the value of median. (3)

(b) For a distribution, the coefficient of variation is 22.5% and the value of arithmetic average is 7.5. Find out the value of standard deviation. (3)

(c) Prove that the correlation coefficient is the geometric mean between the regression coefficients. (4)

(d) Define Slack Variable. (3)

(e) Define the term "Dummy Activity" in Network analysis. (3)

(f) Show the following data of expenditure of an average working-class family by a suitable diagram: (5)

Items of expenditure	% of total expenditure
Food	65%
Fuel and lighting	5%
Clothing	10%
Housing	12%
Miscellaneous	8%

(g) Write the properties of a good measure of variation. (4)

UNIT-I

Q2 (a) Mean and standard deviation of 100 items are found to be 40 and 10. If at the time of calculation two items are wrongly taken as 30 and 70 instead of 3 and 27, find the correct mean and correct standard deviation. (8)

(b) Calculate weighted mean from the following data:- (4.5)

Value	10	12	15	18	20
Weight	2	5	12	4	7

Q3 (a) Write any four merits of Mean. (4.5)

(b) Calculate the modal income for the following data:-

Income (Rs. Per month)	No. of employees
2000-2500	8
2500-3000	12
3000-4000	30
4000-4500	3
4500-5000	2

Also, compute Median. (8)

UNIT-II

Q4 (a) Calculate the correlation coefficient for the following heights (in inches) of father(X) and their sons(Y):- (6.5)

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	79	71

(b) Find the most likely production corresponding to a rainfall 40" from the following data:- (6)

	Rainfall	Production
Average	30"	500kg
Standard deviation	5"	100kg
Coefficient of correlation	0.8	

P.T.O.

Q5 (a) The coefficient of rank correlation between two variables X and Y is 0.4. If $\sum d^2 = 12$ then find n. **(6.5)**

(b) If X and Y are independent then show that the regressions coefficients are zero. **(6)**

UNIT-III

Q6 (a) Using Simplex method, solve the given system of inequations: **(8)**

Maximize $z = 30x_1 + 40x_2 + 20x_3$,

Subject to $10x_1 + 12x_2 + 7x_3 \le 10000$, $7x_1 + 10x_2 + 8x_3 \le 8000$,

$x_1 + x_2 + x_3 \le 1000$, x_1, x_2, $x_3 \ge 0$.

(b) In a shopping mall, the average arrival rate of customer is 10 every 30 minutes following Poisson Process. The average time taken by a cashier to list and calculate the customer's purchase is 2.5 minutes following exponential distribution. Compute- **(4.5)**

(i) The expected time spent by a customer in the queue.

(ii) The expected time spent by a customer in the system.

Q7 (a) Solve the LPP using Simplex method: **(7)**

Minimize $z = 6x + 4y$,

Subject to $-x + y \le 1$, $x + y \ge 3$, x, $y \ge 0$

(b) Write the dual of, Minimize $z = 2x_2 + 5x_3$,

subject to $x_1 + x_2 \ge 2$, $2x_1 + x_2 + 6x_3 \le 6$, $x_1 - x_2 + 3x_3 = 4$, x_1, x_2, $x_3 \ge 0$. **(5.5)**

UNIT-IV

Q8 Using MODI method, obtain an optimum solution of the given below transportation problem- **(12.5)**

		Destination			
		D_1	**D_2**	**D_3**	**Supply**
Source	**S_1**	2	7	4	5
	S_2	3	3	1	8
	S_3	5	4	7	7
	S_4	1	6	2	14
Demand		7	9	18	34

Q9 (a) There are 3 jobs P, Q and R and 3 machines M, N and O. all the jobs can be processed on all machines. The time matrix is given as under:

		Machines (Time in hours)		
		M	**N**	**O**
Jobs	**P**	9	13	15
	Q	13	11	19
	R	15	17	12

How should the jobs be assigned one per machine, so as to minimize the total time? **(7)**

(b) Discuss various types of Assignment problems. **(5.5)**

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