CBCS SCHEME

16/17MBA14

First Semester MBA Degree Examination, Dec.2019/Jan.2020
Quantitative Methods

Time: 3 hrs.

Max. Marks:80

Note: *1. Answer any FOUR full questions from Q.No.1 to 7.*
2. Q.No. 8 is compulsory.

1 a. State the difference between correlation and regression. **(02 Marks)**

  b. The average wages paid to all workers in a factory was Rs.5000. The average wages paid to male and female employees were Rs.5,200 and Rs.4,200 respectively. Determine the percentage of males and females employed by the company. **(06 Marks)**

  c. The median and mode of the following wage distribution are known to be Rs.335 and Rs.340 respectively. Three frequency values from the table are however missing. Find these missing values:

Weekly wages (in Rs.)	0-100	100-200	200-300	300-400	400-500	500-600	600-700
Number of workers	4	16	60	?	?	?	4

The total number of workers is 230. **(08 Marks)**

2 a. State Baye's theorem of probability. **(02 Marks)**

  b. What is meant by correlation analysis? Explain the different types of correlations. **(06 Marks)**

  c. As a result of tests on 20,000 electric bulbs manufactured by a company it was found that the lifetime of the bulb was normally distributed with an average life of 2,040 hours and standard deviation of 60 hours. On the basis of the information, estimate the number of bulbs that are expected to burn for i) More than 2150 hours and   ii) Less than 1960 hours. **(08 Marks)**

3 a. What do you mean by degeneracy? **(02 Marks)**

  b. The data relating to the market price of the shares of three companies are as follows:

Company	LG	IFB	Sony
Average	150	200	125
SD	50	40	20

From the above statement:
i)   Which company shares has the more stability
ii)   Price fluctuations
iii) Which one would you like to dispose and why? **(06 Marks)**

  c. The following table shows the ages and I.Q. level of eight persons:

Age	52	63	45	36	72	65	47	25
I.Q.	62	53	51	25	79	43	60	33

Find the expected IQ level of a person who is 49 years old. **(08 Marks)**

4 a. What is unbalanced transportation problem? How to overcome this problem? (02 Marks)
   b. Explain the rules to be followed during the construction of networks. (06 Marks)
   c. Given the following transportation problem:

Warehouse	Market			Supply
	A	B	C	
1	10	12	7	180
2	14	11	6	100
3	9	5	13	160
4	11	7	9	120
Demand	240	200	220	

It is known that currently nothing can be sent from warehouse 1 to market 'A' and from warehouse 3 to market 'C'. Solve the problem using VAM method and mention whether the solution obtained is optimal? (08 Marks)

5 a. What do you mean by crashing? (02 Marks)
   b. Explain the steps in decision making process. (06 Marks)
   c.

1	5	3	3	34
3	3	1	2	15
0	2	2	3	12
2	7	2	4	19
21	25	17	17	

Calculate initial basic feasible solution using NWC and least cost methods. (08 Marks)

6 a. Differentiate between infeasibility and unboundedness. (02 Marks)
   b. An agriculturist has a 125 acre farm. He produces radish, muttar and potato. Whatever he raises is sold fully in the market. He gets Rs.5 per kg for radish, Rs.4 per kg for muttar and Rs.5 per kg for potato. The average per acre yield is 1500 kg of radish, 1800 kg of muttar and 1200kg of potato. To produce each 100kg of radish and muttar and 80 kg of potato, a sum of Rs.12.50 has to be used for manure. Labour required for each acre to raise the crop is 6 man-days for radish and potato each and 5 man-days for muttar. A total of 500 man-days of labour at a rate of Rs.40 per man-day is available.
   Formulate this as a linear programming model to maximize the agriculturist's total profit. (06 Marks)

   c. Solve graphically:
   Maximize $Z = 10x_1 + 15x_2$
   Subject to $2x_1 + x_2 \leq 26$
   $2x_1 + 4x_2 \leq 56$
   $x_1 - x_2 \geq -5$
   $x_1, x_2 \geq 0$ (08 Marks)

7 a. Illustrate merge and burst events. (02 Marks)
   b. Given the following information on a small project: A is the first activity of the project and precedes the activities B and C. The activity D succeeds both B and C whereas only C is required to start activity E. D precedes F while G succeeds E. H is the last activity of the project and succeeds F and G. Draw a network based on this information. (06 Marks)
   c. Compute Spearman's rank correlation for the following observations:

Candidate:	1	2	3	4	5	6	7	8
Judge X :	20	22	28	23	30	30	23	24
Judge Y :	28	24	24	25	26	27	32	30

Marks are awarded out of 35. (08 Marks)

8 The owner of a chain of fast-food restaurants is considering a new computer system for accounting and inventory control. A computer company sent the following information about the system installation.

Activity Identification	Activity Description	Immediate Predecessor	Time		
			Most Optimistic	Most likely	Most Pessimistic
A	Select computer model	-	4	6	8
B	Design input/output system	A	5	7	15
C	Design monitoring system	A	4	8	12
D	Assemble computer hardware	B	15	20	25
E	Develop the main programs	B	10	18	26
F	Develop input/output routines	C	8	9	16
G	Create database	E	4	8	12
H	Install the system	D, F	1	2	3
I	Test and implement	G, H	6	7	8

a. Construct an arrow diagram for this problem, determine the critical path and state the expected project completion time. **(04 Marks)**

b. Determine the probability that the project will be completed in 55 days. **(04 Marks)**

c. If the company wants to be 90% sure that the system will be installed by a certain due date. How many days prior to that should it start the work? **(04 Marks)**

d. Obtain the earliest and the latest scheduling times of the various activities. **(04 Marks)**

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