

D 51493

(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. (CUCBCSS-UG) DEGREE EXAMINATION  
NOVEMBER 2023**

BBA 3C 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

(2018 Admissions)

Time : Three Hours

Maximum Marks : 80

**Part I**

*Answer all questions.  
Each question carries 1 mark.*

Choose the correct answer from the choices given :

- Eight coins are tossed together. The probability of getting exactly 3 heads is :
 

(a) $1/256$ .	(b) $7/32$ .
(c) $5/32$ .	(d) $3/32$ .
- If A & B are any two events such that  $P(A) + P(B) - P(A \cap B) = P(A)$ , then :
 

(a) $P(B/A) = 1$ .	(b) $P(A/B) = 1$ .
(c) $P(A/B) = 0$ .	(d) $P(B/A) = 0$ .
- The independent variable is used to explain the dependent variable in \_\_\_\_\_.
 

(a) Linear regression analysis.	(b) Multiple regression analysis.
(c) Non-linear regression analysis.	(d) None of the above.
- \_\_\_\_\_ tests follow assumptions about production parameters.
 

(a) Parametric.	(b) Non-parametric.
(c) One-tailed.	(d) Two-tailed.
- Degrees of freedom for Chi-square test in case of contingency table of order  $(5 \times 5)$  is :
 

(a) 25.	(b) 16.
(c) 10.	(d) Infinity.

Fill in the blanks :

- \_\_\_\_\_ is a way of selecting items from a collection, such that the order of selection does not matter.
- In a \_\_\_\_\_ all the possible outcomes are known in advance but none of the outcomes can be predicted with certainty.

**Turn over**

8. Poisson distribution is a \_\_\_\_\_ probability distribution.
9. The process of selecting and using a sample statistic to draw conclusions about the population parameter is called \_\_\_\_\_.
10. Accepting a null hypothesis when it is false is called \_\_\_\_\_.

(10 × 1 = 10 marks)

**Part II**

*Answer any **eight** questions.  
Each question carries 2 marks.*

11. State the significance of Probable Error of  $r$ .
12. Give the limitation of Rank Correlation.
13. What are Type I Errors.
14. Explain critical region.
15. A committee is to be constituted by selecting 2 people at random from a group consisting of 3 Economists and 4 Statisticians. Find the probability that the committee will consist of (a) 2 Economists ; (b) 1 Economist and 1 Statistician.
16. What is the difference between an Independent variable and Dependent variable ?
17. What are equally likely events ? Give examples.
18. When can a Poisson distribution be used to approximate the Binomial distribution.
19. Give any two important functions of Quantitative Techniques.
20. Give any four properties of Normal Distribution.

(8 × 2 = 16 marks)

**Part III**

*Answer any **six** questions.  
Each question carries 4 marks.*

21. Find the coefficient of correlation from the following data :—

X :	12	20	15	22	18	24	20	12	15	22
Y :	30	35	28	36	29	39	30	25	30	38

22. A panel of two judges P and Q graded 7 dramatic performances by independently awarding marks as follows :

Performance :	1	2	3	4	5	6	7
Marks by P :	46	42	44	40	43	41	45
Marks by Q :	40	38	36	35	39	37	41

The eighth performance for which Judge Q could not attend was awarded 37 marks by Judge P. If Judge Q has also been present, how many marks would be expected to have been awarded by him for the eighth performance.

23. The average test mark for a particular class is 79. The Standard Deviation is 5. If the marks are normally distributed, how many students in class of 200 did not receive marks between 75 and 82.
24. The following table shows the distribution of number of faculty units produced in a single shift in a factory. The data is for 400 shifts :

No. of faults :	0	1	2	3	4
No. of shifts :	138	161	69	27	5

Fit a Poisson distribution to the data.

25. Distinguish between Parametric and Non-parametric tests.
26. Define Quantitative techniques. Bring out its limitations.
27. A bag contains 5 white balls and 9 black balls. One ball is drawn from the bag and is not replaced. Then the second is drawn. Find the probability that both the balls of two drawings are white.
28. Explain the Testing of Errors in Hypothesis Testing.

(6 × 4 = 24 marks)

#### Part IV

*Answer any two questions.  
Each question carries 15 marks.*

29. What is Hypothesis Testing ? Give the steps in testing of hypothesis.
30. A survey of 320 families with 5 children each revealed the following distribution :

No. of boys :	5	4	3	2	1	0
No. of girls :	0	1	2	3	4	5
No. of families :	14	56	110	88	40	12

Is this result consistent with the hypothesis that male and female births are equally probable ?

31. The following table gives per hectare yield for 3 varieties of wheat each grown on 5 plots :

Per Hectare yield (in tonnes)

Plot of Land	Variety of Wheat		
	A	B	C
1	5	3	10
2	6	5	13
3	8	2	7
4	1	10	13
5	5	0	17

Test at 5% level of significance.

(2 × 15 = 30 marks)

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Name.....

Reg. No.....

**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION  
NOVEMBER 2022**

B.B.A.

BBA III C 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

(2017—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Part I***Answer all questions.**Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. If two different dice are rolled together, the probability of getting an even number on both dice is :
  - a)  $1/36$ .
  - b)  $1/2$ .
  - c)  $1/6$ .
  - d)  $1/4$ .
2. The probability of obtaining an even prime number on each dice, when a pair of dice is rolled is :
  - a) 0.
  - b)  $1/3$ .
  - c)  $1/12$ .
  - d)  $1/36$ .
3. Which of the following statements is true for correlation analysis ?
  - a) It is a bivariate analysis.
  - b) It is a multivariate analysis.
  - c) It is a univariate analysis.
  - d) Both a) and c).
4. Type II error means \_\_\_\_\_.
  - a) Accepting a true hypothesis.
  - b) Rejecting a true hypothesis.
  - c) Accepting a wrong hypothesis.
  - d) Rejecting a wrong hypothesis.
5. The Correlation co-efficient between two variables is the \_\_\_\_\_ of their regression co-efficients.
  - a) Arithmetic mean.
  - b) Geometric mean.
  - c) Harmonic mean.
  - d) None of these.

**Turn over**

Fill in the blanks :

6. \_\_\_\_\_ is the Hypothesis whose validity is not tested.
7. The independent variable is used to explain the dependent variable in \_\_\_\_\_.
8. In a single throw of a die, the probability of getting a multiple of 3 is \_\_\_\_\_.
9. \_\_\_\_\_ tests follow assumptions about population parameters.
10. Rejecting a null hypothesis when it is true is called \_\_\_\_\_.

(10 × 1 = 10 marks)

### Part II

Answer any **eight** questions.

Each question carries 2 marks.

11. If the value of co-efficient of correlation between two series is 0.9 and its probable error is 0.0128, what would be the value of  $n$  ?
12. Explain Type I Error.
13. Explain Two Tailed Test.
14. Give any *two* situations where Binomial Distribution can be applied.
15. What is Probability Distribution ? Give its classification.
16. What is Region of Acceptance ?
17. What is Skewness ?
18. What is Statistical Inference ?
19. Give the assumptions of Chi-square test.

(8 × 2 = 16 marks)

### Part III

Answer any **six** questions.

Each question carries 4 marks.

20. Explain the merits of Normal Distribution.
21. A bag contains 8 balls identical except for colour of which 5 are red and 3 white. A man draws 2 balls at random one after another without replacement. What is the probability that one of the balls drawn is white and the other red ?

22. Fit a Normal Distribution to the following data :

Class	:	12–15	16–19	20–23	24–27	28–31	32–35	36–39
Frequency	:	6	10	22	25	20	12	9

23. A fertilizer mixing machine is set to give 4 kg of Nitrate for every quintal bag of fertilizers. Five 100 kg bags are examined. The percentage of nitrate are 2, 6, 4, 3, 1. Is there reasons to believe that the machine is defective ?
24. What is ANOVA ? Write a note on its types
25. The odds against X solving the Business Statistics problem are 8 to 6 and the odds in favour of student Y solving the same problem are 14 to 16. What is the probability that a) Problem is solved ; b) Problem is not solved ?
26. Define Chi-square Distribution. Give the properties of Chi-square distribution.
27. Differentiate between one tailed test and two tailed tests.
28. In a multiple choice quiz each question has 5 alternatives, out of them only one answer is correct. What is the probability of 6 correct answers out of 10 questions ?

(6 × 4 = 24 marks)

#### Part IV

*Answer any two questions.*

*Each question carries 15 marks.*

29. A book has 700 pages. The number of pages with various number of misprints is recorded below. At 5 % level of significance, are the misprints distributed according to Poisson Law :

Number of misprints X	:	0	1	2	3	4	5	Total
Number of pages with X misprints	:	616	70	10	2	1	1	700

30. A survey of 320 families with 5 children each revealed the following distribution :

No. of boys	:	5	4	3	2	1	0
No. of girls	:	0	1	2	3	4	5
No. of families	:	14	56	110	88	40	12

Is this result consistent with the hypothesis that male and female births are equally probable ?

**Turn over**

31. The following table gives the yields of 15 sample fields under three varieties of seeds A, B and C.

Yields		
A	B	C
5	3	10
6	5	13
8	2	7
1	10	13
5	0	17

Test at 5 % level of significance.

(2 × 15 = 30 marks)

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(Pages : 4)

Name.....

Reg. No.....

**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION  
NOVEMBER 2021**

B.B.A.

BBA IIIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

(2014—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.  
Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. Standard Error arises due to use of :
  - (a) Complete Enumeration of Survey.
  - (b) Use of Sampling.
  - (c) Both (A) and (B).
  - (d) Neither (A) nor (B).
2. If A and B are two events such that  $P(A) \neq 0$  and  $P(B/A) = 1$  then :
  - (a)  $A \subset B$ .
  - (b)  $B \subset A$ .
  - (c)  $B = \phi$ .
  - (d)  $A = \phi$ .
3. In a single throw of a die, the probability of getting a multiple of 3 is :
  - (a)  $1/2$ .
  - (b)  $1/3$ .
  - (c)  $1/6$ .
  - (d)  $2/3$ .
4. The co-efficient of correlation is not dependent on :
  - (a) Change of Scale.
  - (b) Change of Origin.
  - (c) Both (A) and (B).
  - (d) None of the above.
5. The Original Hypothesis is known as :
  - (a) Alternate Hypothesis.
  - (b) Null Hypothesis.
  - (c) Simple Hypothesis.
  - (d) Casual Hypothesis.

**Turn over**

Fill in the blanks :

6. When the expected frequencies and observed frequencies completely coincide, the Chi-square value will be \_\_\_\_\_.
7. If one regression coefficient is negative, the other is \_\_\_\_\_.
8. Correlation is a \_\_\_\_\_ measure showing association of variables.
9. \_\_\_\_\_ is the Hypothesis whose validity is not tested.
10. \_\_\_\_\_ is a Probability Distribution where mean equal to variance.

(10 × 1 = 10 marks)

### Part II

*Answer any **eight** questions.  
Each question carries 2 marks.*

11. State the basic assumptions made for Analysis of Variance.
12. Give two uses of Correlation.
13. Classical Probability is often called a priori probability. Why ?
14. State Bayes' Theorem.
15. 4 dice are thrown 162 times. The occurrence of 2 and 3 is consider a success. In how many throws do you expect : (a) Exactly 2 success ; and (b) At least one success.
16. Distinguish between Mutually Exclusive and Not Mutually Exclusive Events.
17. What is Level of Significance ?
18. Define Null Hypothesis.
19. What is a Non-Parametric Test ?
20. Give any *two* significances of Quantitative Techniques in Business.

(8 × 2 = 16 marks)

### Part III

*Answer any **six** questions.  
Each question carries 4 marks.*

21. Explain the procedure for Hypothesis Testing.
22. In a partially destroyed record of an analysis of correlation data the following results only are legible. Variance of  $x = 9$ . Regression equations :  $8x - 10y + 66 = 0$  ,  $40x - 18y = 214$ . Find (a) The mean value of X and Y ; (b) The co-efficient of Correlation ; (c) The standard deviation of Y.

23. A fertilizer mixing machine is set to give 4 kg. of Nitrate for every quintal bag of fertilizers. Five 100 kg. bags are examined. The percentage of nitrate are 2, 6, 4, 3,1. Is there reasons to believe that the machine is defective ?
24. Define Chi-square Distribution. Give the properties of Chi-quare distribution.
25. A puzzle is given to 2 students A and B. The odds against student A in solving it is 10 to 6. Odds is favour of B solving the puzzle is 10 to 12.
- What is the probability of solving the puzzle if both A and B try ?
  - If both try independently what is the probability of solving the puzzle.
  - What is the probability that neither solve the puzzle ?
26. The variable X follows a Normal Distribution with mean 45 and SD 10. Find the probability that : (a)  $x \geq 60$  ; and (b)  $40 \leq x \leq 56$ .
27. Find the co-efficient of correlation between X and Y and Interpret the result :
- |   |   |     |     |     |     |     |     |
|---|---|-----|-----|-----|-----|-----|-----|
| X | : | 1.2 | 1.1 | 1.9 | 1.8 | 1.0 | 0.9 |
| Y | : | 15  | 10  | 20  | 10  | 10  | 5   |
28. What are Quantitative Techniques ? Bring out the scope of Quantitative Techniques

(6 × 4 = 24 marks)

**Part IV**

*Answer any two questions.  
Each question carries 15 marks.*

29. In a survey of 2000 students of which 55 % were undergraduates, 20 % favored the autonomous colleges, while 40 % of the post graduates opposed. Test at 5 % level of significance that opinions of undergraduates and post graduate students on autonomous status of colleges are independent.
30. The following table gives the yields of 15 sample fields under three varieties of seeds A, B and C.

<i>Yields</i>		
A	B	C
5	3	10
6	5	13
8	2	7
1	10	13
5	0	17

Test at 5 % level of significance.

**Turn over**

31. A systematic sample of 100 pages was taken from the Concise Exphoria Dictionary and the observed frequency distribution of foreign words per page was found to be as follows. Calculate the expected frequencies using Poisson Distribution. Also compute variance of fitted distribution.

No. of foreign words per page ( $x$ )	:	0	1	2	3	4	5	6
Frequency ( $f$ )	:	48	27	12	7	4	1	1

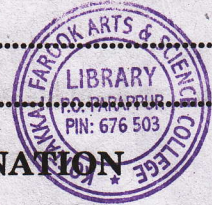
(2 × 15 = 30 marks)

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(Pages : 4)

Name.....

Reg. No.....



**THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION  
NOVEMBER 2020**

**B.B.A.**

**BBA IIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS**

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.*

*Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. The theory used to determine the optimum strategy in a competitive situation :

- (a) Sequencing. (b) Network theory.  
(c) Game theory. (d) Simulation.

2. The regression co-efficient  $b_{xy}$  if  $3x + 2y + 4 = 0$  is the equation of  $x$  on  $y$  :

- (a)  $2/3$ . (b)  $-2/3$ .  
(c)  $4/3$ . (d)  $-4/3$ .

3. The probability of getting a total of 7 or 11 in a single throw with two dice :

- (a)  $1/3$ . (b)  $2/3$ .  
(c)  $2/9$ . (d)  $3/9$ .

4. A random variable  $X$  has the values land 2 with probabilities  $1/3$  and  $2/3$  respectively. Then its mean :

- (a)  $2/3$ . (b) 1.  
(c)  $4/3$ . (d)  $5/3$ .

**Turn over**



**Part III**

*Answer any six questions.  
Each question carries 4 marks.*

21. Explain Statistical Quantitative Techniques ?
22. The Co-efficient of rank correlation of the marks obtained by 10 students in statistics and English was 0.2. It was later discovered that the difference in ranks of one of the students was wrongly takes as 7 instead of 9. Find the correct result.
23. Following information is obtained from the records of a business organization :—
- |                                 |   |    |    |    |    |    |    |    |    |
|---------------------------------|---|----|----|----|----|----|----|----|----|
| Sales (in '000)                 | : | 91 | 53 | 45 | 76 | 89 | 95 | 80 | 65 |
| Advertisement Expense (in '000) | : | 15 | 8  | 7  | 12 | 17 | 25 | 20 | 13 |
- 1 Obtain the two regression equations ; and
  - 2 Estimate the advertisement expenditure for a sale of Rs. 1,20,000.
24. A manufacturing firm produces units of products in 4 plants, A, B, C and D. From the past records of the proportions of defectives produced at each plant, the following conditional probabilities are set :— A : 0.5 ; B : 0.10 ; C : 0.15 and D : 0.02 The first plant produces 30 % of the units of the output, the second plant produces 25 %, third 40 % and the fourth 5 % A unit of the products made at one of these plants is tested and is found to be defective. What is the probability that the unit was produced in Plant C.
25. Explain the procedure of testing of hypothesis.
26. In a sample study about the tea habit in two towns, following data are observed in a sample of size 100 each :—
- Town —A :- 51 persons were male, 31 were tea drinkers and 19 were male tea drinkers.
- Town — B :- 46 persons were male, 17 were male tea drinkers and 26 were tea drinkers.
- Is there any association between sex and tea habits ?
27. Explain the procedure of Wilcoxon matched pairs test signed rank test.
28. Distinguish between one way ANOVA and two way ANOVA ?

(6 × 4 = 24 marks)

**Turn over**

## Part IV

Answer any two questions.  
Each question carries 15 marks.

29. Two random sample were drawn from two normal populations and their values are :—

A : 66 67 75 76 82 84 88 90 92  
B : 64 66 74 78 82 85 87 92 93 95 97

Examine whether the standard deviations of the population are equal ?

30. From the adult population of four large cities, random samples were selected and the number of married and unmarried men were recorded

## CITIES

	A	B	C	D	Total
Married	137	164	152	147	600
Single	32	57	56	35	180
Total	169	221	208	182	780

Is there significant variation among the cities in the tendency of men to marry.

31. Apply the technique of analysis of variance to the following data relating to yields of 4 varieties of wheat in 3 blocks :

Varieties	Blocks		
	X	Y	Z
A	10	9	8
B	7	7	6
C	8	5	4
D	5	4	4

Carry two-way analysis of variance.

(2 × 15 = 30 marks)

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(Pages : 4)

Name.....

Reg. No.....

THIRD SEMESTER B.Com./B.B.A. DEGREE EXAMINATION, NOVEMBER 2019

(CUCBCSS—UG)

B.B.A.

BBA IIIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.*

*Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. Queuing theory is also known as :

- (a) Decision theory. (b) Waiting line theory.  
(c) Game theory. (d) None of these.

2. The range of variation of probability lies between :

- (a)  $-\infty < p < +\infty$ . (b)  $-\infty < p < 0$ .  
(c)  $0 < p < +\infty$ . (d)  $0 < p < 1$ .

3. The lines of regression intersect at the point :

- (a) (X, Y). (b) Mean of (X, Y).  
(c) (0, 0). (d) (1, 1).

4. A family of parametric distribution in which mean is equal to variance is :

- (a) Binomial distribution. (b) Poisson distribution.  
(c) Gamma distribution. (d) Normal distribution.

5. The outcomes of an experiment classified as success A and failure  $A^c$  will follow a Bernoulli distribution if :

- (a)  $P(A) = 1/2$ . (b)  $P(A) = 0$ .  
(c)  $P(A) = 1$ . (d)  $P(A)$  remains constant in all trials.

**Turn over**

Fill in the blanks :

6. The square of the standard normal variate is called \_\_\_\_\_ distribution.
7. The technique of analysis of variance is developed by \_\_\_\_\_.
8. Poisson distribution is a limiting form of \_\_\_\_\_ distribution.
9. If co-efficient of correlation  $r = 0.9$  then co-efficient of determination is \_\_\_\_\_ %.
10. The probability of getting both heads when two coins are tossed simultaneously is \_\_\_\_\_.

(10 × 1 = 10 marks)

### Part II

*Answer any eight questions.*

*Each question carries 2 marks.*

11. What is a programming techniques ?
12. What is Karl Pearson's co-efficient of correlation ?
13. What are the limitations of regression analysis ?
14. A sub-committee of 6 members is to be formed out of a group consisting of 7 men and 4 ladies. Calculate the probability that the sub-committee will consist of (i) exactly two ladies ; (ii) at least two ladies.
15. State addition theorem and find it for three events ?
16. If 20% of the articles produced by a machine are defective. Find the probability that out of 4 articles chosen at random (a) At most 2 are defective ; (b) Exactly 3 are defective.
17. If  $X \sim P(1)$  and  $Y \sim P(2)$ , then find  $P(X + Y < 3)$ .
18. Define sampling distribution of a statistic ?
19. What is Chi-square test ?
20. What is ANOVA ?

(8 × 2 = 16 marks)

### Part III

*Answer any six questions.*

*Each question carries 4 marks.*

21. What are the limitations of quantitative techniques ?

22. The following table shows the respective IQ's of 10 fathers and their eldest sons. Calculate rank correlation co-efficient :

Father's IQ	:	91	97	102	103	103	105	110	114	116	124
Son's IQ	:	102	94	105	115	113	99	98	112	120	108

23. Two variables gave the following data  $r = 0.7$ . Obtain the two regression lines and find the most likely value of Y when  $X = 24$  :

Variables →	X	Y
Mean	20	15
S.D.	4	3

24. The compensation received by 1000 workers in a factory are given in the following table :—

Wages	:	80-100	100-120	120-140	140-160	160-180	180-200
No. of Workers	:	10	100	400	250	200	40

Find the probability that a worker selected has (1) Wages under Rs. 100 (2) Wages above Rs.140 (3) Wages between Rs. 120 and Rs. 180.

25. A Systematic sample of 100 pages was taken from a dictionary and the observed frequency distribution of foreign words per page was found to be as follows: Calculate the expected frequencies using Poisson Distribution :

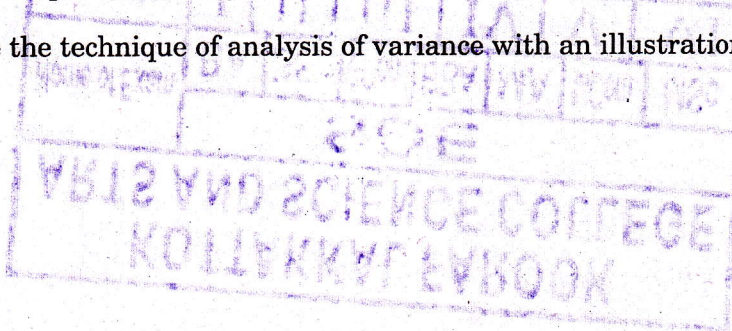
No. of foreign words per page (x)	:	0	1	2	3	4	5	6
Frequency (f)	:	48	27	12	7	4	1	1

26. A factory was producing electric bulbs of average length of 2000 hours. A new manufacturing process was introduced with the hope of increasing the length of the life of bulbs. A sample of 25 bulbs produced by the new process was examined and the average length of life was found to be 2200 hours. Examine whether the average length of bulbs was increased assuming the length of lives of bulbs follow normal distribution with  $\alpha = (0.05)$ .

27. Explain the procedure of  $\chi^2$ -test as a test of independence ?

28. Describe the technique of analysis of variance with an illustration for one-way classifications ?

(6 × 4 = 24 marks)



Turn over

## Part IV

Answer any two questions.

Each question carries 15 marks.

29. Explain the procedure of fitting binomial distribution.

The following data shows the number of seeds germinating out of 10 on damp filter paper for 80 set of seeds. Fit a binomial distribution of data and find the expected frequencies :

X	:	0	1	2	3	4	5	6	7	8	9	10
f	:	6	20	28	12	8	6	0	0	0	0	0

30. Test whether the accidents occur uniformly over week days on the basis of the following information :—

Days of the week	:	Sun	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	:	11	13	14	13	15	14	18

31. Given below is 16 pairs of values showing the performance of two machines A and B. Test whether there is difference between the performances. Table value of Wilcoxon 'T' at 5% significant is 25 :

A : 73, 43, 47, 53, 58, 47, 52, 58, 38, 61, 56, 56, 34, 55, 65, 75

B : 51, 41, 43, 41, 47, 32, 24, 58, 43, 53, 52, 57, 44, 57, 40, 68

(2 × 15 = 30 marks)

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(Pages : 4)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2018**

(CUCBCSS—UG)

Complementary Course

**BBA III C 03—QUANTITATIVE TECHNIQUES FOR BUSINESS**

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.*

*Each question carries 1 mark.*

Choose the correct answer from the choices given :

- In testing of hypothesis the inferences are made based on the :
  - Population.
  - Events.
  - Samples.
  - Prediction.
- From a pack of 52 cards one card is drawn at random. Find the probability that it is either a spade or an ace of club :
  - 12/52.
  - 13/52.
  - 14/52.
  - 15/52.
- The lines of regression intersect at the point :
  - (X, Y).
  - Mean of (X, Y).
  - (0, 0).
  - (1, 1).
- The Binomial distribution tends to Poisson distribution at :
  - $n \rightarrow \infty$ .
  - $p \rightarrow 0$ .
  - $n \rightarrow \infty$  and  $p \rightarrow 0$ .
  - None of the above.
- The outcomes of an experiment classified as success A and failure  $A^c$  will follow a Bernoulli distribution if :
  - $P(A) = 1/2$ .
  - $P(A) = 0$ .
  - $P(A) = 1$ .
  - $P(A)$  remains constant in all trials.

**Turn over**

Fill in the blanks :

6. A random variable  $X$  has  $E(X) = 2$ ,  $E(X^2) = 8$ . Then  $V(x) = \underline{\hspace{2cm}}$ .
7. The technique of analysis of variance is developed by           .
8. Binomial distribution is made up of            trials.
9. If coefficient of correlation  $r = 0.9$  and the number of observations is 10 then the probable error is           .
10. The probability of getting both heads when two coins are tossed simultaneously is           .

(10 × 1 = 10 marks)

### Part II

*Answer any eight questions.  
Each question carries 2 marks.*

11. What are the functions of Quantitative Techniques ?
12. What are the different methods of measuring correlation ?
13. What are the limitations of regression analysis ?
14. The probability that Sachin Tendulkar scores a century in a cricket match is  $1/3$ . What is the probability that out of 5 matches, he may score century in :—
  - (1) Exactly 2 matches.
  - (2) No match.
15. What are the properties of Poisson distribution ?
16. In a factory manufacturing optical lenses, there is a small chance of  $1/1500$  for any one lense to be defective. The lenses are supplied in packets of 10. Use Poisson Distribution to calculate the approximate number of packets containing (1) one defective ; (2) no defective in a consignment of 20,000 packets. You are given that  $e^{-0.02} = 0.9802$ .
17. What are the important uses of Z test.
18. A sample of 900 items is taken from a population with S.D.15. The mean of the sample is 25. Test whether the sample has come from a population with mean 26.8 ?
19. What is Chi-square test ?
20. What are the characteristics of Analysis of Variance ?

(8 × 2 = 16 marks)

## Part III

Answer any six questions.  
Each question carries 4 marks.

21. What are the limitations of quantitative techniques ?
22. Calculate Pearson's co-efficient of correlation between age and playing habits of students :

Age	:	20	21	22	23	24	25
No. of students	:	500	400	300	240	200	160
Regular players	:	400	300	180	96	60	24

23. Two variables gave the following data  $r = 0.7$  Obtain the two regression lines and find the most likely value of Y when  $X = 24$  :

Variables →	X	Y
Mean	20	15
S.D.	4	3

24. 20% of students in a university are graduates and 80% are undergraduates. The probability that graduate student is married is 0.50 and the probability that an undergraduate student is married is 0.10. If one student is selected at random, what is the probability that the student selected is married ?
25. Consider families with 4 children each. What percentage of families would you expect to have :
- Two boys and two girls.
  - At least one boy.
  - No girls.
  - At the most two girls.
26. What are the properties of normal distribution ?
27. Explain the procedure of  $\chi^2$  - test as a test of independence ?
28. Describe the technique of analysis of variance with an illustration for one-way classifications ?

(6 × 4 = 24 marks)

Turn over

## Part IV

Answer any two questions.  
Each question carries 15 marks.

29. Fit a normal distribution of the following data :

Marks	:	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of students	:	4	22	48	66	40	16	4

30. The following table gives data regarding election to an office :—

Attitude towards election			
Economic Status	Rich	Poor	Total
Favourable	50	155	205
Non-favourable	90	110	200
Total	140	265	4015

Is attitude towards election influenced by economic status of workers ?

31. Given below is 16 pairs of values showing the performance of two machines A and B. Test whether there is difference between the performances. Table value of Wilcoxon 'T' at 5% significant is 25.

A : 73, 43, 47, 53, 58, 47, 52, 58, 38, 61, 56, 56, 34, 55, 65, 75

B : 51, 41, 43, 41, 47, 32, 24, 58, 43, 53, 52, 57, 44, 57, 40, 68

(2 × 15 = 30 marks)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.Com./B.B.A. DEGREE (SUPPLEMENTARY)  
EXAMINATION, NOVEMBER 2017**

(UG—CCSS)

BB 111C 03—QUANTITATIVE TECHNIQUE FOR BUSINESS MANAGEMENT

Time : Three Hours

Maximum : 30 Weightage

**Part A**

*Answer all the questions.*

*Each question carries a weightage of  $\frac{1}{4}$ .*

A. Fill in the blanks :

- 1 Quantitative techniques do not deal with the \_\_\_\_\_ data
- 2 The number of ways of arranging 4 books on a shelf is \_\_\_\_\_.
- 3 The mean and variance of a binomial variate are 16 and 8, then the size of the sample is \_\_\_\_\_.
- 4 Whether a test is one-sided or two-sided depends on \_\_\_\_\_ hypothesis.

B. Choose the correct answer from brackets :

5 Two mutually exclusive events A and B are :

- (a) Always independent.
- (b) Never independent.
- (c) Never independent if  $A \neq \Phi, B \neq \Phi$ .
- (d) None of these.

6 If X and Y are independent Poisson variates with parameters  $\lambda_1$  and  $\lambda_2$  respectively, then X + Y is distributed as :

- (a) Binomial.
- (b) Normal.
- (c) Poisson.
- (d) None of these.

7 Power of a test is related to :

- (a) Type I error.
- (b) Type II error.
- (c) Both (a) and (b).
- (d) None of these.

**Turn over**

- 8 When one regression Coefficient is negative the other would be ?
- (a) Negative. (b) Positive.  
(c) Zero. (d) Either positive or negative.

C. State whether True or False :

- 9 A normal distribution is mesokurtic.  
10 The hypothesis  $H_0 : \theta > \theta_0$  is a simple hypothesis.  
11 Students'  $t$  test was invented by RA Fisher.  
12 The degree of relationship between the variables is termed as correlation.

(12 × ¼ = 3 weightage)

**Part B**

*Answer all nine questions in one or two sentences each.  
Each question carries 1 weightage.*

- 13 Define a quantitative technique.  
14 Define Statistical independence.  
15 Define a binomial distribution.  
16 What do you mean by hypothesis ?  
17 What is meant by ANOVA ?  
18 Distinguish between regression and correlation.  
19 Define coefficient of determination.  
20 What is conditional probability ?  
21 Distinguish between significance level and power of the test.

(9 × 1 = 9 weightage)

**Part C**

*Answer any five questions.  
Each question carries 2 weightage.*

- 22 What are the main limitations of quantitative techniques.  
23 Explain the different approaches to Probability.  
24 Explain the assumptions and properties of binomial distribution.  
25 What are the main properties of Normal distribution ?

- 26 The probability of P, Q, R, S and T solving a problem are  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$  and  $\frac{1}{6}$  respectively. Find the probability that a problem given to them will be solved.
- 27 Assume the mean height of the soldiers to be 68.22 inches with a variance of 10.8 inches. How many soldiers of a regiment of 1000 would you expect to be over six feet tall ?
- 28 A sample of 400 observations was taken from the population with standard deviation 15. If the mean of the sample is 27. Test the hypothesis that whether the mean of the population is equal to 24 at 5% level of significance.

(5 × 2 = 10 weightage)

### Part D

*Answer any two questions.*

*Each question carries 4 weightage.*

- 29 What are the important techniques used in quantitative techniques ? Explain their limitations.
- 30 The following table shows the ages (X) and blood pressure (Y) of 8 persons :

X	:	52	63	45	36	72	65	47	25
Y	:	62	53	51	25	79	43	60	33

Obtain the two regression lines and also find the expected blood pressure of a 49 year old persons.

- 31 Three varieties A,B and C of paddy were sown in 4plots each and the following yield in quintals per acre were obtained. Set up analysis of variance (ANOVA) table and find out whether there is a significant differences between the mean yields of the three varieties :

plots	Varieties		
	A	B	C
1	10	9	4
2	6	7	7
3	7	7	7
4	9	5	6

(2 × 4 = 8 weightage)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2016**

(CUCBCSS—UG)

Complementary Course

BBA III C 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all questions.*

1. Standard deviation of the sampling distribution is called :
  - (a) Probable error.
  - (b) Standard error.
  - (c) Mean deviation.
  - (d) Coefficient of variation.
2. Mean, Median and Mode are equal for :
  - (a) Binomial distribution.
  - (b) Poisson distribution.
  - (c) Normal distribution.
  - (d) None of these.
3. The idea of testing of hypothesis is first set forth by :
  - (a) R.A Fisher.
  - (b) J. Neyman.
  - (c) Karl Pearson.
  - (d) James Bernouli.
4. Which of the following is not a parametric test :
  - (a) Chi square test.
  - (b) Z-test.
  - (c) *t*-test.
  - (d) None of these.
5. CPM stands for :
  - (a) Critical process method.
  - (b) Critical Path Method.
  - (c) Critical Performance Measurement.
  - (d) Critical Programme method.
6.  $\sigma^2$  is the variance of :
  - (a) Binomial distribution.
  - (b) Poisson distribution.
  - (c) Normal Distribution.
  - (d) None of these.

**Turn over**

7. An approximate relation between MD about mean and SD of a normal distribution is \_\_\_\_\_.
- (a)  $5MD = 4SD$ . (c)  $3MD = 2SD$ .  
 (b)  $3MD = 3SD$ . (d)  $4MD = 2SD$ .
8. A normal distribution requires two parameters, namely the mean and \_\_\_\_\_.
- (a) Median. (c) Standard deviation.  
 (b) Mode. (d) Mean Deviation.
9. The hypothesis under test is :
- (a) Alternative Hypothesis. (c) Null Hypothesis.  
 (b) Simple hypothesis. (d) All of these.
10. Quartile deviation of normal distribution is equal to :
- (a)  $4/5$  S.D. (c)  $2/3$  S.D.  
 (b)  $3/4$  S.D. (d) 1 S.D.

(10 × 1 = 10 marks)

**Part II (Short Answer Questions)***Answer any eight questions.*

11. Define quantitative technique.
12. What is axiomatic approach to probability ?
13. What do you mean by multiple regressions ?
14. What is statistical inference ?
15. Write a note on two tailed and one tailed tests.
16. Define ANOVA.
17. A trucking company to test the average life of each of the four brands of tyre's. The company uses all brands on randomly selected trucks, the record showing the lives (thousands of miles) of tyre's are as given :

Brand 1	Brand 2	Brand 3	Brand 4
20	19	21	15
23	15	19	17
18	17	20	16
17	20	17	18

Test the hypothesis that the average life of each brand of types is the same. Assume  $\alpha = 0.01$

18. Define Probability.
19. What is random variable ?
20. What are different types of quantitative techniques ?

(8 × 2 = 16 marks)

**Part III (Short Essays)***Answer any six questions.*

21. What are the difference between regression and correlation ?
22. Explain Baye's Theorem.
23. Write a note on limitations of quantitative techniques.
24. Write a note on uses of T- test.
25. Explain the terms :
  - (a) Level of significance.
  - (b) Critical values.
  - (c) Degree of freedom.
  - (d) Statistics and parameter.
26. State the importance and uses of Normal distribution.
27. From the data given below find the regression equation of  $x$  on  $y$  :

X	:	5	6	7	3	2
Y	:	4	5	2	8	1

28. What is non parametric test ? What are the steps involved in it ?

(6 × 4 = 24 marks)

**Part IV (Long Essay)***Answer any two questions.*

29. From the following data obtain the two regression equations :

Sales	:	91	97	108	121	67	124	51	73	111	57
Purchases	:	71	75	69	97	70	91	39	61	80	47

30. The variable  $X$  follows Normal Distribution with mean 45 and S.D 10. Find the probability that :

- (a)  $x > 60$ .
- (b)  $40 < x < 56$ .

31. Define correlation ? Explain the different methods for studying correlation.

(2 × 15 = 30 marks)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE (SUPPLEMENTARY/IMPROVEMENT)  
EXAMINATION, NOVEMBER 2015**

(UG—CCSS)

Complementary Course

BB IIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS MANAGEMENT

Time : Three Hours

Maximum : 30 Weightage

*Answer all twelve questions.*

I. (A) Fill in the blanks :

- 1 If  $P(A) = 0.2$ , then  $P(A^c) =$  \_\_\_\_\_.
- 2 The mean of Binomial distribution  $B(n, p)$  is \_\_\_\_\_.
- 3 Critical region is also known as \_\_\_\_\_.
- 4 If  $\rho = \pm 1$ , then the two regression lines are \_\_\_\_\_.

(B) Choose the correct answer :

- 5 For a Binomial distribution mean is \_\_\_\_\_.  
(a) Greater than variance.      (b) Less than variance.  
(c) Equal to variance.          (d) None of these.
- 6 The value of probability lies in between \_\_\_\_\_.  
(a)  $-\infty$  to  $+\infty$ .              (b)  $-\infty$  to 1.  
(c)  $-1$  to  $+1$ .                  (d) 0 to 1.
- 7 Correlation coefficient measures :  
(a) Variability.                  (b) Location.  
(c) Concentration                (d) Relation.
- 8 Degrees of freedom for statistic  $\chi^2$  in case of  $2 \times 2$  contingency table is :  
(a) 3.                                (b) 4.  
(c) 1.                                (d) 2.

(C) State whether True or False :

- 9 Rejecting  $H_0$  when  $H_0$  is true is called type II error.
- 10 The purpose of the regression is to study dependence between variables.

Turn over

- 11 For a Binomial distribution, when  $p$  is greater than 1,  $q$  should be less than 1.  
 12 If the events A and B are mutually exclusive, then they cannot occur together.

(12 × ¼ = 3 weightage)

*Short Answer Type Questions.*

*Answer all nine questions.*

- II. 13 What are the axioms of probability ?  
 14 Let A and B be events with  $P(A) = 1/5$ ,  $P(B) = 1/4$  and  $P(A \cap B) = 1/10$ . Find  $P(A \cup B)$ .  
 15 Explain the two types of errors in testing of hypothesis.  
 16 Find the Binomial distribution with mean 3 and variance 2.  
 17 What is meant by perfect correlation ?  
 18 Comment on the following :  
 "For a Poisson distribution, mean = 10, variance = 6".  
 19 Distinguish between large sample and small sample tests.  
 20 What are the uses of F-test ?  
 21 Write short notes on classification of quantitative techniques.

(9 × 1 = 9 weightage)

*Short Essay or Paragraph Questions.*

*Answer any five questions from seven.*

- 22 Explain the procedure of testing independence of two attributes.  
 23 Define Normal distribution. Describe its properties.  
 24 The prices of shares of a company on the different days in a month were found to be 66, 65, 69, 70, 69, 71, 70, 63, 64, 68. Discuss whether mean price of the shares in the month is 65.  
 25 Fit a Binomial distribution to the following data :—
- |     |   |   |    |    |    |   |   |
|-----|---|---|----|----|----|---|---|
| $x$ | : | 0 | 1  | 2  | 3  | 4 | 5 |
| $f$ | : | 6 | 20 | 28 | 12 | 8 | 6 |
- 26 From the following information on values of two variables X and Y, find the Regression line of  $y$  on  $x$ .

$$n = 17, \sum x = 544, \sum y = 244, \sum x^2 = 19040, \sum y^2 = 3773, \sum xy = 8413.$$

27 Calculate the coefficient of correlation :

$x$	:	7	8	9	6	5
$f$	:	8	6	7	9	10

28 Write short notes on : (i) Mutually exclusive events and ; (ii) Conditional probability.

(5 × 2 = 10 weightage)

*Essay Questions.*

Answer any two questions.

29 Two researchers adopted different sampling techniques while investigating the same group of students to find the number of students falling in different intelligence levels. The results are as follows :

Researcher	No. of students in each level				Total
	Below Average	Average	Above Average	Genius	
X	86	60	44	10	200
Y	40	33	25	2	100
Total	126	93	69	12	300

Using  $\chi^2$  test, would you say that the sampling techniques adopted by the two researchers are significantly different ?

30 Ten competitors in a musical test were ranked by three judges A, B and C in the following order :-

Ranks by A : 1 6 5 10 3 2 4 9 7 8

Ranks by B : 3 5 8 4 7 10 2 1 6 9

Ranks by C : 6 4 9 8 1 2 3 10 5 7

Use rank correlation coefficient to determine which pair of judges has the nearest approach to common likings in music.

31 A company has 2 plants they manufacture scooters. Plant I manufacture 80% of the scooters and plant II manufactures 20%. At plant I 85 out of 100 scooters are rated standard quality. At plant II only 65 out of 100 scooters are rated standard quality. What is the probability that the scooter selected at random came from plant I if it is known that the scooter is of standard quality ?

(2 × 4 = 8 weightage)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2015**

(CUCBCSS—UG)

Complementary Course

**BBA IIIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS**

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.  
Each question carries 1 mark.*

Choose the correct answer from the choices given :

- 1 An event in probability is :
  - (a) Actual outcome.
  - (b) Random outcome.
  - (c) Expected outcome.
  - (d) Possible outcome.
- 2 The height of persons in a country is a random variable of the type :
  - (a) Discrete random variable.
  - (b) Continuous random variable.
  - (c) Continuous as well as discrete random variable.
  - (d) Neither discrete nor continuous random variable.
- 3 Sampling is inevitable in the solution of :
  - (a) Blood test of a person.
  - (b) When population is infinite.
  - (c) Test of life of dry battery cells.
  - (d) All the above.
- 4 Correlation of two variables is zero, it indicate :
  - (a) Positive correlation.
  - (b) Negative correlation.
  - (c) No correlation.
  - (d) None of these.
- 5 If X and Y are independent, the value of  $b_{yx}$  is equal to :
  - (a) 0.
  - (b) 1.
  - (c)  $\infty$ .
  - (d) Any positive value.

Turn over

Fill in the Blanks :

- 6 The hypothesis complementary to null hypothesis is \_\_\_\_\_.
- 7 Two coins tossed simultaneously, probability of getting atleast one head is \_\_\_\_\_.
- 8 When observed frequency are given in the shape of contingency table then the degree of freedom is \_\_\_\_\_.
- 9 If both regression coefficients are negative, then the correlation coefficient would be \_\_\_\_\_.
- 10 If ratio of change in one variable is equal to the ratio of change in the other variable, the correlation is said to be \_\_\_\_\_.

(10 × 1 = 10 marks)

### Part II

*Answer any eight questions.  
Each question carries 2 marks.*

- 11 Explain the scope of quantitative techniques.
- 12 What is partial correlation ?
- 13 Distinguish between type I error and type II error.
- 14 Define regression analysis.
- 15 Distinguish between dependent event and independent event.
- 16 A fair coin is tossed ; find the chance of getting 3 heads.
- 17 The probability that a contractor will get a plumbing contract is  $\frac{2}{3}$  and the probability that he will not get an electric contract is  $\frac{5}{9}$ . If the probability of getting atleast one contract is  $\frac{4}{5}$ . What is the probability that he will get both the contracts.
- 18 A computer while calculating the correlation coefficient between two variables X and Y from 17 pairs of observations obtained the following results.

$$n = 17 \quad \Sigma x = 544 \quad \Sigma x^2 = 19040 \quad \Sigma y = 244 \quad \Sigma y^2 = 3773 \quad \Sigma xy = 8413$$

Find the correlation coefficient  $b_{yx}$ .

- 19 Define standard normal distribution.
- 20 What is level of significance of a test ?

(8 × 2 = 16 marks)

### Part III

*Answer any six questions.  
Each question carries 4 marks.*

- 21 Explain different types of correlation.
- 22 State and prove addition theorem for two events. Deduce the results for three events.

- 23 What do you mean by one way analysis of variance ? Explain procedure for carrying out analysis of variance in one way classification.
- 24 The average life of 26 electric bulbs were found to be 1,200 hours with a standard deviation of 150 hours. Test whether these bulbs could be considered as a random sample from a normal population with mean 1300 hours.
- 25 An urn A contains 2 white and 4 blackballs. Another urn B contains 5 white and 7 black balls. A ball is transferred from the urn A to urn B. Then a ball is drawn from urn B. Find the probability that it will be white.
- 26 Calculate coefficient of correlation between X and Y from the following data :
- $$n = 13 \quad \Sigma d_x = 117 \quad \Sigma d_x^2 = 1313 \quad \Sigma d_y = 260 \quad \Sigma d_y^2 = 6580 \quad \Sigma d_x d_y = 2827.$$
- 27 Eight coins were tossed together, 256 times. Find the expected frequencies of heads.
- 28 Coefficient of correlation between two variables is calculated to be  $-0.98$ . Find the value of probable error and hence interpret the result ( $n = 10$ ). Find the limits within which population correlation may lie.

(6 × 4 = 24 marks)

## Part IV

*Answer any two questions.  
Each question carries 15 marks.*

- 29 Explain the procedure generally followed in testing of a hypothesis, point out the difference between one tail and two tail tests.
- 30 The following table gives the yield of three varieties :

Varieties	Yields				
1	30	27	42		
2	51	47	37	48	42
3	44	35	41	36	

Perform an analysis of variance on this data.

- 31 From the following data of the age of husband and the age of wife, form the two regression equations and calculate the husband's age, when the wife's age is 16.

Husband's age	:	36	23	27	28	29	30	31	33	35
Wife's age	:	29	18	20	27	21	29	27	29	28

Also find the age of wife when husband's age is 40.

(2 × 15 = 30 marks)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2014**

(UG-CCSS)

Complementary Course

BB 3C 03—QUANTITATIVE TECHNIQUE FOR BUSINESS MANAGEMENT

Time : Three Hours

Maximum : 30 Weightage

*Answer all twelve questions.*

I. A. Fill in the blanks :

- 1 If A and B are mutually exclusive events, then  $P(A \cap B) =$  \_\_\_\_\_.
- 2 If  $\beta$  is the probability of Type II error then  $(1 - \beta)$  is called \_\_\_\_\_.
- 3 The standard deviation of Poisson distribution with mean 4 is \_\_\_\_\_.
- 4 The regression equation of y on x is \_\_\_\_\_.

B. Choose the correct answer :

5 The mean of a Binomial distribution is 3 and  $n = 9$ , then its variance is

- |                     |                     |
|---------------------|---------------------|
| (a) 2.              | (b) $\frac{1}{2}$ . |
| (c) $\frac{2}{3}$ . | (d) $\frac{3}{2}$ . |

6 If  $P(A) = 0.40$ ,  $P(B) = 0.30$ ,  $P(A \cup B) = 0.60$ , then  $P(A \cap B)$  is :

- |           |           |
|-----------|-----------|
| (a) 0.70. | (b) 0.01. |
| (c) 0.10. | (d) 0.07. |

7  $b_{xy} \times b_{yx} =$  \_\_\_\_\_.

- |        |          |
|--------|----------|
| (a) 1. | (b) - 1. |
| (c) r. | (d) -r.  |

8  $P(A \cup B) = P(A) + P(B)$  implies, A and B are :

- |                  |                         |
|------------------|-------------------------|
| (a) Independent. | (b) Dependent.          |
| (c) Exhaustive.  | (d) Mutually exclusive. |

C. State whether True or False :

- 9 The probability of an impossible event is 1.
- 10 Variance of a Binomial distribution is always less than its mean.
- 11 The signs of two regression coefficients must be opposite.
- 12 Probability of type I error is called the level of significance.

(12  $\times$   $\frac{1}{4}$  = 3 weightage)

**Turn over**

*Short Answer Type Questions.**Answer all nine questions.*

- II. 13 State the Multiplication theorem of probability for two events.  
 14 Let A and B be events with  $P(A) = \frac{1}{2}$ ,  $P(B) = \frac{1}{3}$  and  $P(A \cap B) = \frac{1}{4}$ . Find  $P(A/B)$ .  
 15 Explain the two types of errors in testing of hypothesis.  
 16 If X follows Poisson distribution with parameter  $\lambda$  such that  $P(x = 1) = P(x = 2)$ , find the mean of the distribution.  
 17 What is meant by correlation between two variables ?  
 18 Define Binomial distribution.  
 19 Write down the test statistic of Chi-square test, for testing the goodness of fit.  
 20 Write any four properties of Normal distribution.  
 21 What are the limitations of quantitative techniques ?

(9 × 1 = 9 weightage)

*Short Essay or Paragraph Questions.**Answer any five questions.*

- III. 22 A bag contains 7 white and 9 black balls. Three balls are drawn at random. Find the probability that balls drawn are (i) 1 white and 2 black ; (ii) 2 white and 1 black.  
 23 The customer accounts at a certain departmental store have an average balance of Rs. 120 and standard deviation of Rs. 40. Assuming that the account balances are normally distributed.  
 (i) What proportion of the accounts as over Rs. 150.  
 (ii) What proportion of accounts in between Rs. 100 and Rs. 150 ?  
 24 Samples of sizes 10 and 14 were taken from 2 normal populations with standard deviations 3.5 and 5.2 and the sample means were found to be 20.3 and 18.6. Test whether the means of two populations are the same at 5 % level.  
 25 Fit a Poisson distribution to the following data :—
- |     |   |     |    |    |   |   |                         |
|-----|---|-----|----|----|---|---|-------------------------|
| $x$ | : | 0   | 1  | 2  | 3 | 4 |                         |
| $f$ | : | 123 | 59 | 14 | 3 | 1 | ( $e^{-0.5} = 0.6065$ ) |
- 26 From the following information on values of two variables X and Y, find the two regression lines  $n = 10, \sum x = 300, \sum y = 250, \sum x^2 = 9138, \sum y^2 = 6414, \sum xy = 7623$ .  
 27 What are the properties of Correlation Coefficient ?  
 28 Explain in detail the procedure of hypothesis testing.

(5 × 2 = 10 weightage)

*Essay Questions.**Answer any two questions.*

- IV. 29 A trucking company wishes to test the average life of each of the three brands of tyres. The company uses all branches on randomly selected trucks. The records showing the lives (thousands of miles) of tyres are as given. Using ANOVA, test the hypothesis that the average life for each brand is the same.

Brand I	Brand II	Brand III
6	6	2
1	3	5
5	4	6
0	3	7

- 30 Calculate the correlation coefficient for the following heights (in inches) of fathers and their sons :

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

- 31 Three factories A, B, C supply respectively 25 %, 35 % and 40 % of the bricks mudded by a construction company. From past experience it is known that 5 %, 4 % and 2 % of the bricks supplied by these factories are defective. What is the probability that a brick found defective was supplied by B.

(2 × 4 = 8 weightage)

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(Pages : 3)

Name.....

Reg. No.....

**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2013**

(UG-CCSS)

Complementary Course

BB IIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS MANAGEMENT

Time : Three Hours

Maximum : 30 Weightage

**Part A**

*Answer all the questions.*

*Each question carries a weightage of  $\frac{1}{4}$ .*

A. Fill in the blanks :

- 1 Quantity is the root from which the concept of \_\_\_\_\_ technique is developed.
- 2 \_\_\_\_\_ research is a quantitative technique applied in the process of decision-making.
- 3 When the amount of change in one variable leads to a constant ratio of change in the other variable, correlation is said to be \_\_\_\_\_.
- 4 The regression coefficient of Y on X is denoted by \_\_\_\_\_.

B. Choose the correct answer from brackets :

5 When the occurrence of an event is certain, probability of the event is equal to :

- |                    |                     |
|--------------------|---------------------|
| (a) Zero.          | (b) Equal to one.   |
| (c) More than one. | (d) Less than zero. |

6 If A and B are two mutually exclusive events ; then probability of  $(A \cup B)$  is equal to :

- |                          |                            |
|--------------------------|----------------------------|
| (a) $P(AB)$ .            | (b) $P(A) + P(B)$ .        |
| (c) $P(A) \times P(B)$ . | (d) $\frac{P(AB)}{P(A)}$ . |

7 The probability of getting 3 with one die and 5 with another die by throwing simultaneously two six faced dice is :

- |                      |                      |
|----------------------|----------------------|
| (a) $\frac{1}{36}$ . | (b) $\frac{1}{12}$ . |
| (c) $\frac{2}{36}$ . | (d) $\frac{2}{12}$ . |

Turn over

8 Mean of a binomial distribution is :

- (a)  $n$ . (b)  $np$ .  
(c)  $npq$ . (d)  $\sqrt{npq}$ .

C. State whether True or False :

- 9 Normal curve is a skewed curve.  
10 Chi-square test is a parametric test.  
11 For a Poisson distribution mean = 8 and variance = 7.  
12 Scatter diagram is a graphical method of studying correlation.

(12 × ¼ = 3 weightage)

### Part B

*Answer all nine questions in one or two sentences each.  
Each question carries 1 weightage.*

- 13 Define Quantitative Techniques.  
14 Define the term "Probability".  
15 What is meant by sample space ?  
16 Define "Independent event".  
17 State any two properties of correlation coefficient.  
18 Define 'Hypothesis'.  
19 What do you mean by Standard Error ?  
20 What is Analysis of Variance ?  
21 State the Addition Theorem of Probability.

(9 × 1 = 9 weightage)

### Part C

*Answer any five questions.  
Each question carries 2 weightage.*

- 22 Explain the different approaches to the Theory of Probability.  
23 What are the properties of Normal distribution ?  
24 Discuss the role of correlation in business and economic studies.  
25 In a box there are 8 white, six blue and 10 pink balls. If 3 balls are drawn at random from the box ; what is the probability that :  
(a) Two balls are white.  
(b) None of 3 is pink.  
(c) 3 balls are blue.

- 26 Fit a binomial distribution to the following data relating to the number of seeds germinating out of 10 on damp filter for 80 set :
- |     |   |    |    |    |   |   |   |   |   |   |    |
|-----|---|----|----|----|---|---|---|---|---|---|----|
| X : | 0 | 1  | 2  | 3  | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| f : | 6 | 20 | 28 | 12 | 8 | 6 | 0 | 0 | 0 | 0 | 0  |
- 27 Between the hours 10 a.m. and 11 a.m., the average number of customers coming to a retail shop is 2.5. Find the probability that during one particular hour there will be :
- (a) Exactly 3 customers coming.
  - (b) No customers coming.
  - (c) At least 3 customers coming to the shop.
- 28 The weekly wages of 10,000 workers are normally distributed with around a mean of Rs. 700 and with a standard deviation of Rs. 50. Estimate the number of workers whose weekly wages will be :
- (a) Between Rs. 700 and 720.
  - (b) Between Rs. 690 and 720.

(5 × 2 = 10 weightage)

#### Part D

*Answer any two questions.*

*Each question carries 4 weightage.*

- 29 Discuss the applications of QT in business.
- 30 For a random sample of 100 workers from Kerala, the average daily wage was Rs. 105.00 with a standard deviation of Rs. 15.00. For a sample of 150 workers from Assam, the corresponding figures are Rs. 80.00 and Rs. 10.00 respectively. Can it be concluded that the average wages of workers in Kerala is more than that of average wages of workers of Assam.
- 31 From the following information obtain two regression equations and coefficient of correlation :

X :	5	7	8	9	6
Y :	2	3	6	5	4

(2 × 4 = 8 weightage)

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Name.....

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**THIRD SEMESTER B.B.A. DEGREE EXAMINATION, NOVEMBER 2017**

(CUCBCSS—UG)

Complementary Course

BBA IIIC 03—QUANTITATIVE TECHNIQUES FOR BUSINESS

Time : Three Hours

Maximum : 80 Marks

**Part I**

*Answer all the questions.*

*Each question carries 1 mark.*

Choose the correct answer from the choices given :

1. An operation research technique which resembles a real life situation :
  - (a) Decision theory.
  - (b) Simulation.
  - (c) Game theory.
  - (d) Queuing theory.
2. The range of variation of correlation coefficient lies between :
  - (a)  $-\infty < r < +\infty$ .
  - (b)  $-\infty < r < +1$ .
  - (c)  $-1 < r < +\infty$ .
  - (d)  $-1 < r < +1$ .
3. Geometric mean of the regression coefficients will be :
  - (a) Coefficient of variation.
  - (b) Coefficient of correlation.
  - (c) Coefficient of determination.
  - (d) None of these.
4. The probability of all possible outcomes of a random experiment is always equal to :
  - (a) Infinity.
  - (b) Zero.
  - (c) One.
  - (d) None of these.
5. The mean and variance of a binomial distribution are 8 and 4 respectively. Then  $P [x = 1]$  is equal to :
  - (a)  $1/2^{12}$ .
  - (b)  $1/2^4$ .
  - (c)  $1/2^6$ .
  - (d)  $1/2^8$ .

Turn over

Fill in the blanks :

6. \_\_\_\_\_ is the method which involves both statistical and mathematical techniques.
7. The standard deviation of the sampling distribution is termed as \_\_\_\_\_.
8. If  $\beta$  be the probability of type II error then  $1 - \beta$  is termed as \_\_\_\_\_.
9. \_\_\_\_\_ test is a non-parametric test used to compare three or more samples.
10. Analysis of variance utilizes \_\_\_\_\_ test.

(10 × 1 = 10 marks)

### Part II

*Answer any eight questions.*

*Each question carries 2 marks.*

11. What do you mean by Quantitative Techniques ?
12. What is Spearman's rank correlation ?
13. What are the uses of regression analysis ?
14. The probability that A solves a problem in statistics is  $\frac{2}{5}$  and the probability that B solves it is  $\frac{3}{8}$ . if they try independently find the probability that :
  - (i) Both solve the problem.
  - (ii) at least one solve the problem.
  - (iii) none solve the problem.
15. What is the probability that a leap year selected at random will contain 53 Sundays ?
16. State any two applications of normal distribution.
17. A Poisson variate X is such that  $P [X = 1] = 2 P [X = 2]$  then find  $P [X = 3]$ .
18. Explain simple hypothesis and composite hypothesis by examples.
19. Distinguish parametric and non-parametric tests.
20. What is F-test ?

(8 × 2 = 16 marks)

**Part III***Answer any six questions.**Each question carries 4 marks.*

21. What are the uses of quantitative techniques ?
22. From the data given below calculate Karl Pearson's coefficient of correlation :
- |                |   |    |    |    |    |    |    |    |
|----------------|---|----|----|----|----|----|----|----|
| Age of husband | : | 25 | 26 | 27 | 28 | 30 | 32 | 35 |
| Age of wife    | : | 20 | 22 | 24 | 25 | 26 | 27 | 34 |
23. From the following regression lines find the mean values of X and Y also find the correlation coefficient  $r$ .  $20X - 9Y = 107$  ;  $4X - 5Y = -33$ .
24. A committee is to be constituted by selecting three people at random from a group consisting of 5 Economists and 4 Statisticians. Find the probability that the committee will consist of :
- (a) 3 Economists.
  - (b) 3 Statisticians.
  - (c) 2 Economists and 1 Statistician.
  - (d) 1 Economist and 2 Statistician.
25. In a Binomial Distribution consisting 5 independent trials, probability for 1 and 2 successes are 0.4096 and 0.2048 respectively. Find the parameter  $p$  and then fit the distribution.
26. The average number of articles manufactured by two machines per day are 200 and 250 with S.D. 20 and 25 respectively on the basis of 25 days' production. Can you regard both the machines as equally efficient at 1% level of significance ?
27. Explain the procedure of  $\chi^2$ -test as a test of goodness of fit.
28. Describe the technique of analysis of variance with an illustration for a two-way classifications ?

 $(6 \times 4 = 24 \text{ marks})$ **Part IV***Answer any two questions.**Each question carries 15 marks.*

29. Fit a normal distribution of the following data :

Marks	:	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of Students	:	4	22	48	66	40	16	4

**Turn over**

30. Two random sample were drawn from two normal populations and their values are :

A	:	66	67	75	76	82	84	88	90	92		
B	:	64	66	74	78	82	85	87	92	93	95	97

Examine whether the standard deviations of the population are equal.

31. The following data relate to the yield of 4 varieties of rice each shown on 5 plots. Find whether there is significant difference between the mean yield of these varieties :

Plot name.	Treatment			
	1	2	3	4
P	99	103	109	104
Q	101	102	103	100
R	103	100	107	103
S	99	105	97	107
T	98	95	99	106

(2 × 15 = 30 marks)