BBM 304 Reg. No. .....

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION OCTOBER 2013

BUSINESS MANAGEMENT

QUANTITATIVE TECHNIQUES FOR BUSINESS – II

Business Mathematics

Time: 3 Hrs Max. Marks: 80

SECTION – A

Answer any Three questions: **3X15=45**

1. Solve the following LPP by simplex method

   Maximise Z=3x+4y

   Subject to $2x+5y \leq 19$

   $4x+3y \leq 17$

   And $x \geq 0$; $y \geq 0$

2. a) Find the compound interest and amount for 4800 for 3 years at 4% per annum when

   i) the interest is payable half yearly, and

   ii) the interest is payable quarterly. **(10 marks)**

   b) Find x, y, and z if $\begin{bmatrix} x & 2 & \square 3 \\ 5 & y & 2 \\ 1 & \square 1 & z \end{bmatrix} \times \begin{bmatrix} 3 & \square 1 & 2 \\ 4 & 2 & 5 \\ 2 & 0 & 3 \end{bmatrix} \square \begin{bmatrix} 5 & 3 & 3 \\ 19 & \square 5 & 16 \\ 1 & \square 3 & 0 \end{bmatrix}$

3. a) Briefly explain the various OR models used in business. **(5 marks)**

   b) If 15 men working 12 hours per day perform job in 16 days, how long will it take 21 men working 10 hours daily to do the same task? **(5 marks)**

   c) If $A \square \begin{bmatrix} \square 4 & 1 \\ 7 & 3 \end{bmatrix}$ and $A+2B=A^2$, find B. **(5 marks)**

4. a) Consider the following transportation matrix. Find the initial feasible solution by Least cost method.

	1	2	3	Supply
1	50	60	53	150
2	45	55	60	250
3	50	60	65	350
4	50	60	50	250
Demand	200	350	450	1000

(5 marks)

b) A machine is purchased for `10,000. Depreciation is calculated at 8% per annum on the diminishing value. Find the value of the machine after 10 years. **(5 marks)**

c) Find the banker's discount on `900 due 5 months at 16%p.a. **(5 marks)**

SECTION – B

Answer any Five out of Six questions: 5X5=25

5. Solve the following using Cramer's rule.
   x-y-2z=3
   2x+y+z=5
   4x-y-2z=11
6. A man wishes to pay back his debt of `2,522, by three equal annual instalments. Find the amount of each instalment at 5%p.a. compound interest.
7. Travelling at a speed of 35 miles/hour a distance can be covered in two hours. How long will it take to cover the same distance at 30 miles/hr?
8. Explain the main phases of OR study.
9. Explain the steps in formulating a Linear Programming Problem.
10. What is a transportation problem? Outline the steps in solving a transportation problem.

SECTION - C

11. **Answer all the questions: 10X1=10**

a) What is a scalar matrix?

b) If $A = \begin{bmatrix} 1 & 2 \\ 4 & 1 \end{bmatrix}$ find A^2

c) What is perpetuity?

d) What is a deferred annuity?

e) If 5:20::3:x, find the value of x.

f) Find the Banker's gain if Banker's discount is `101.29 and True Discount is `96.72.

g) Define OR.

h) What is a slack variable?

i) Mention one limitation of LP Model.

j) What is a feasible region in a LP Model?

BBM 304 **Reg. No. ……**

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION OCTOBER 2014

BUSINESS MANAGEMENT

QUANTITATIVE TECHNIQUES FOR BUSINESS – II

BUSINESS MATHEMATICS

Time: 3 Hrs **Ma**

SECTION – A

Answer any Three questions:

1. a) A sum of money amounts to ` 1326 in 6 years at 5% per annum simple interest. In what time will it amount to ` 1530?

   b) A certain sum of money was lent at compound interest. The amount is ` 3380 after 2 years and ` 3512.20 after 3 years. Find the sum and rate of interest.

   c) If the difference between the true discount and Bankers discount on a sum due in 4 months at 3% is ` 21.5, find the face value of the bill.

   (5+5+5)

2. a) Solve the following LPP by Simplex method.

   Maximize $[illegible]$

   Subject to $[illegible] \leq 440$

   $[illegible] \leq 470$

   $[illegible] \leq 430$

   $[illegible] \geq 0$

   (10)

   b) Explain briefly the North-West Corner Rule and Lowest Cost Entry method of obtaining IBFS to the transportation problem.

3. a) If find

b) Solve the following using Cramer's Rule.

c) Obtain the inverse of . **(5+5+5)**

4. a) The true discount on a certain bill is $\frac{4}{5}$ of the bankers discount and the rate is 10%. Find the time.

b) There are 4 bills one each for ` 200, ` 80, ` 60 and ` 120. Their respective due dates are the 12th March, the 27th March, 18th April and 6th April. Find the equated due date.

c) The following table shows all the necessary information on the available supply to each warehouse, the requirement of each market and the unit of transportation cost from each warehouse to each market.

		MARKET				
		I	II	III	IV	Supply
	A	5	2	4	3	22
Warehouse	B	4	8	1	6	15
	C	4	6	7	5	8
Requirement		7	12	17	9	

Determine the Initial Basic Feasible Solution by Least cost method.

SECTION – B

Answer any Five questions:

5. With 15% trade discount and 5% cash discount the selling price of an article ` 64.60. Find the marked price of an article.

6. A person hands over his car to another person on the terms that he should be paid 5 annual instalments of ` 20,000 each, the first instalment being paid at the lapse of 3 years. Find the present worth of the car at which it is handed over the interest rate is 12.5%.

7. A person wants to accumulate ` 2,50,000 for the marriage of his daughter 7 years hence he plans to deposit equal yearly instalments at 15% compound interest p.a. Find the yearly deposit if the first deposit is made at the end of the year.

8. If show that . Also show that

9. Explain the limitations and applications of Linear Programming Problems.

10. A shopkeeper made a profit of 15% on an article which he sold for ` 2300. On another article which he sold for ` 1501 he incurred a loss of 5%. Find his net profit. Also find his percentage profit.

SECTION - C

11. **Answer all the questions:**

a) Give a mathematical model of a transportation problem.

b) Distinguish between present value and future value.

c) At what interest rate will Rs. 6,000 yield Rs. 140 simple interest in 2 years.

d) If then what is –3A?

e) Find the value of *X* if 73 : 45 : : x : 110

f) What do you mean by optimum solution in an LPP.

g) If 10% of the students in a college of strength 700 are boys, then what is the number of boys?

h) Find the maturity value of Rs. 2000/- at 4% compound interest for a period of 2 years.

i) If $\begin{vmatrix} & \\ & \end{vmatrix} = 0$ Find x

j) If 12 tailors are able to carry out a Contract in 30 days. How many tailors will be needed to complete it in 20 days?

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BBM 304.1 **Reg. No. ……**

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION
OCTOBER 2015
BUSINESS MANAGEMENT
Business Mathematics

Time: 3 Hrs.

SECTION – A

Answer any Three questions:

1. a) Solve the following LPP by Simplex Method.

$Maximize\ z = 4x + 3y$

Subject to constraints

$x + y \le 4$

$3x + 2y \le 18$

$x \ge 0, y \ge 0$ **(10 marks)**

b) Find an allocation of available sources by lowest cost entry method and compute the transportation cost.

	To		
X	Y	Z	Availability

From	A	8	7	3	60
	B	3	8	9	70
	C	11	3	5	80
	Requirement	50	80	80	210

2. a) Solve the following equations by Cramer's rule.

$$2x + y - z = 7$$
$$x + y + z = 1$$
$$x - 2y - 3z = 4$$

(10 marks)

b) Find the inverse of the following matrix.

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 2 \\ 1 & 3 & 0 \end{bmatrix}$$

(5 marks)

3. a) A man lent at simple interest `1,600 partly at 8% and partly at 9%p.a. If the total interest received after one year is `140. How much did he lend at 8%.
   b) The banker's gain one certain bill due six months hence is 100 and the rate of interest is 10%p.a. Find the face value of the bill.
   c) What is the rate of compound interest at which a sum doubles in 5 years?

4. a) In how many years would 800 deposited in a bank amount to 1327.61 at 13.5%p.a.a compound interest?
   b) Deposit of 200 each are made every year for 9 years. At 17% compound interest, what is the amount at the end of the 9th year? Also find the present value of annuity.
   c) The cash price of a machine is `11,400. The trade discount and cash discount are 20% and 5% respectively. Find the catalogue price?

SECTION – B

Answer any Five questions:

5. If $A = \begin{bmatrix} 7 & 3 & 5 \\ 1 & 2 & 3 \\ 2 & 4 & 6 \end{bmatrix}$ show that |A| = 0

6. Find the equated due date of payment of the following bills.

   `200 due on 11th August
   `400 due on 10th October
   `500 due on 14th September

7. A sales man is allowed 5% commission on total sales plus a bonus of 1% on the excess of sales over `20,000. If he earns `1350 on commission alone find his total earnings.

8. A bill with face value 3,000 is due after 3 months. It is discounted through a bank @ 15% p.a. Calculate true discount, bankers discount and bankers gain.

9. Solve the following LPP graphically.

   $Maximize\ z = 3x + 4y$

   Subject to $4x + 2y \leq 80$
   $2x + 5y \leq 180$
   $2x, y \geq 0$
   $x \geq 0, y \geq 0$

10. Briefly explain phases Operations Research.

SECTION - C

11. **Answer all the questions:**

a) Find $\begin{bmatrix} 2 & 0 \\ 4 & 1 \end{bmatrix} \times \begin{bmatrix} -1 & 2 \\ -3 & 0 \end{bmatrix}$

b) Write the adjoint of the matrix $\begin{bmatrix} 2 & 3 \\ 2 & 1 \end{bmatrix}$

c) A damp takes 3 hours to lift 2,500 liters of water. What time will it take to lift 1500 litres?

d) Find the compound interest on `6,000 for 3 years @ 10%p.a.

e) Find the sum if 15% of the sum is `343.50.

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BBM 304 **Reg. No. ……**

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION
OCTOBER 2015
BUSINESS MANAGEMENT
Quantitative Techniques for Business – II
Business Mathematics

Time: 3 Hrs.

SECTION – A

Answer any Three questions:

1. a) Solve the following equations by Cramer's Rule.

$7x + 6y - 5z = 30$
$3x - 4y + z = 0$
$x + 2y - 3z = 10$ **(10 marks)**

b) A man save `16,500 in 10 years. In each year after the first, he saved `100 more than he did in the preceding year. How much he did save in the first year?

2. a) If $A = \begin{bmatrix} 1 & 2 \\ 3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 0 & 1 \\ 2 & 0 \end{bmatrix}$ find $3A + 4B - 5C$ **(5 marks)**

b) The Banker's gain on certain bill due 6 months is `100 and the rate of interest is 10%p.a. Find the face value.

c) Find the equated due date of payment of the following bills:

i) `500 due on 10th August
ii) `1000 due on 15th September
iii) `250 due on 10th October
iv) `400 due on 25th October

3. a) $A = \begin{bmatrix} 1 & -1 & 1 \\ 2 & -1 & 3 \\ -3 & -2 & 4 \end{bmatrix}$ find A^{-1} **(10 marks)**

b) A company produces 2 types of castings A and B. Each castings of A requires 5 hours grinding and 3 hours of polishing. Each casting of B requires 3 hours of grinding and 7 hours of polishing. Company has 3 grinders and 4 polishers. Each grinder works 50 hours a work and each polishers works 70 hours a week. The profit on type A casting is `10 per unit, for type B casting 12 per unit.
Formulate as on LPP.

4. a) Solve the following LPP by simplex method

$Maximise\ Z = x_1$
$Subject\ to\ -x_1 - 2x_2 \geq -6$
$4x_1 + 3x_2 \leq 12$
$x_1 = x_2 \geq 0$ **(10 marks)**

b) Briefly explain the various operating research models used in business.

SECTION – B

Answer any Five questions:

5. Determine the compound interest on `2,000 at 10%p.a. for 1 ½ years; when interest is compounded half yearly.

6. What is a transportation problem? Outline the steps in solving a transportation problem.

7. A property is let out on a 10 year lease at an annual rental of `80,000. Considering interest at 16%p.a., calculate the present value.

8. If $A = \begin{bmatrix} 2 & -1 & 4 \\ 3 & -1 & 3 \\ 1 & 2 & -1 \end{bmatrix}$ find |A|

9. Marked price of a book is `420. If the retailer buys it at 20% discount and sells it at the marked price. Find his percentage profit.

10. Determine on initial basic feasible solution to following transportation problem using North West Cost Rule.

	D_1	D_2	D_3	D_4	Supply
O_1	6	4	1	5	14
O_2	8	9	2	7	16
O_3	4	3	6	2	5
Required	6	10	15	4	35

SECTION - C

11. **Answer all the questions:**

a) Find the compound interest for `15,000 at 6% for 7 years.
b) What is a slack variable?
c) Define feasible solution.
d) Write any two phases of O.R.
e) What is deferred Annuity?
f) Find the value of x if 63:35::x:100.
g) Write any two types of matrix.
h) The pay of a person is 3,500. If govt. growth increases by 4% find the increase in his pay.
i) What do you mean by Present value of Annuities?
j) If $\begin{vmatrix} 4 & 5 \\ 2 & 4p \end{vmatrix}$ is a singular matrix, find p.

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BBM 304 Reg. No. .....

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION
OCTOBER – 2016
BUSINESS MANAGEMENT
QUANTITATIVE TECHNIQUES FOR BUSINESS – II
(BUSINESS MATHEMATICS)

Time: 3 Hrs. **Max. Marks: 80**

SECTION – A

Answer any Three questions: **3×15=45**

1. a) Solve the following equation by Cramer's rule.

$$2x - y + 8z = 13$$
$$3x + 4y + 5z = 18$$
$$5x - 2y + 7z = 20$$ **(10)**

b) If $A = \begin{bmatrix} 2 & 3 \\ -4 & 6 \end{bmatrix}$ and $A = \begin{bmatrix} 3 & 5 \\ 9 & -4 \end{bmatrix}$ Find $A^2 + 2AB + B^2$ **(05)**

2. a) National Savings Certificate of face value of ₹ 100 are worth ₹ 2015 after 6 years. What is the rate of Compound Interest? **(05)**

b) A man left 2,500 to his two sons aged 10 years and 15 years with the direction that the sum should be divided in such a way that the 2 sons will get the same amount when they attain the age of 30 years. Assuming that the rate of compound interest is 5%p.a. Calculate how much the younger son received in the beginning? **(05)**

c) In how many years will a deposit doubles itself at 12.5% compound interest. **(05)**

3. Solve the following LPP by simplex method.

Maximize $Z = 2000x + 1000y$

Subject to $x + y \leq 400$

$8x + y \leq 2600$

and $x, y \geq 0$ **(15)**

4. a) A shopkeeper made a profit of 15% on an article which he sold for ₹2300. On another article which he sold for ₹1501 he incurred loss of 5%. Find his net profit, also find his percentage profit. **(05)**

b) The Management Association of a College decides to award prizes worth ₹3000 to the best out going student of BBM at the end of each year. To meet this liability, what sum is to be deposited in a bank assuming an interest rate of 8% p.a. If the prize is to be awarded only for 10 years, what amount is to be deposited? **(05)**

c) Define operation research? Explain the scope of operation research. **(05)**

SECTION – B

Answer any Five questions: **5×5=25**

5. If $A = \begin{bmatrix} -1 & 3 \\ 6 & 2 \end{bmatrix}$ Find A^{-1}

6. At what rate of simple interest does a principal double itself in 6 years?

7. Find the equated due date,
   ₹ 200 due on 11th August
   ₹ 400 due on 20th October
   ₹ 500 due on 14th September

8. A bill with face value of ₹710 is due 3 months hence. The bill is discounted through a bank at 16% p.a. find the true discount and banker's discount?

9. Suppose you expect to receive an annuity of 1000 p.a. for 5 years, each receipt occurring at the beginning of the year. The discount rate is 12%. What is the present value of this annuity?

10. Determine an initial basis feasible solution to the following transportation problem using North West Corner method.

		Destination				
		P	Q	R	S	Supply
Source	X	11	13	17	14	250
	Y	16	18	14	10	300
	Z	21	24	13	10	400
	Demand	200	225	272	250	

SECTION - C

11. **Answer all the questions:** **10×1=10**
   a) Define feasible solution.
   b) Find the 4th proportional to 5, 8 and 16.
   c) What is a Slack variable.
   d) If $\begin{bmatrix} -6 & 3 \\ 1+x & 1 \end{bmatrix} = 0$ find x.
   e) What is meant by Annuity due? And give one example.
   f) What is scalar matrix?
   g) What is perpetuity?
   h) What is deferred annuity?
   i) If 5:20::3:x, find the value of x.
   j) Find the Banker's gain if Banker's discount is ₹101.29 and True Discount is ₹96.72

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BBM 304.1 Reg. No. .....

CREDIT BASED THIRD SEMESTER B.B.M. DEGREE EXAMINATION
OCTOBER – 2016
BUSINESS MANAGEMENT
BUSINESS MATHEMATICS

Time: 3 Hrs. **Max. Marks: 80**

SECTION – A

Answer any Three questions: **3×15=45**

1. a) Solve the following equation by Cramer's rule.

$$2x - y + 8z = 13$$
$$3x + 4y + 5z = 18$$
$$5x - 2y + 7z = 20$$

(10)

b) If $A = \begin{bmatrix} 2 & 3 \\ -4 & 6 \end{bmatrix}$ and $A = \begin{bmatrix} 3 & 5 \\ 9 & -4 \end{bmatrix}$ Find $A^2 + 2AB + B^2$ **(05)**

2. a) National Savings Certificate of face value of ₹ 100 are worth ₹ 2015 after 6 years. What is the rate of Compound Interest? **(05)**

b) A man left 2,500 to his two sons aged 10 years and 15 years with the direction that the sum should be divided in such a way that the 2 sons will get the same amount when they attain the age of 30 years. Assuming that the rate of compound interest is 5%p.a. Calculate how much the younger son received in the beginning? **(05)**

c) In how many years will a deposit doubles itself at 12.5% compound interest. **(05)**

3. Solve the following LPP by simplex method.

Maximize $Z = 2000x + 1000y$

Subject to $x + y \leq 400$

$8x + y \leq 2600$

and $x, y \geq 0$ **(15)**

4. a) A shopkeeper made a profit of 15% on an article which he sold for ₹2300. On another article which he sold for ₹1501 he incurred loss of 5%. Find his net profit, also find his percentage profit. **(05)**

b) The Management Association of a College decides to award prizes worth ₹3000 to the best out going student of BBM at the end of each year. To meet this liability, what sum is to be deposited in a bank assuming an interest rate of 8% p.a. If the prize is to be awarded only for 10 years, what amount is to be deposited? **(05)**

c) Define operation research? Explain the scope of operation research. **(05)**

SECTION – B

Answer any Five questions: **5×5=25**

5. If $A = \begin{bmatrix} -1 & 3 \\ 6 & 2 \end{bmatrix}$ Find A^{-1}

6. At what rate of simple interest does a principal double itself in 6 years?

7. Find the equated due date,
   ₹ 200 due on 11th August
   ₹ 400 due on 20th October
   ₹ 500 due on 14th September

8. A bill with face value of ₹710 is due 3 months hence. The bill is discounted through a bank at 16% p.a. find the true discount and banker's discount?

9. Suppose you expect to receive an annuity of 1000 p.a. for 5 years, each receipt occurring at the beginning of the year. The discount rate is 12%. What is the present value of this annuity?

10. Determine an initial basis feasible solution to the following transportation problem using North West Corner method.

		Destination				
		P	Q	R	S	Supply
Source	X	11	13	17	14	250
	Y	16	18	14	10	300
	Z	21	24	13	10	400
	Demand	200	225	272	250	

SECTION - C

11. **Answer all the questions:** **5×2=10**
    a) Define feasible solution.
    b) Find the 4th proportional to 5, 8 and 16.
    c) What is a Slack variable.
    d) If $\begin{bmatrix} -6 & 3 \\ 1+x & 1 \end{bmatrix} = 0$ find x.
    e) What is meant by Annuity due? And give one example.

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