Karachi university business school
University of Karachi
Final Examination, June 2011: Affiliated Colleges
Business Mathematics- BA (H)-322
BS-II

Date: June 11, 2010

Max Marks: 60
Max Time: 3hrs

Instructions: Attempt all questions in sequence preferably.

Q.1. A dietitian is planning a menu for the evening meal at university dining hall. Three main items will be served, all having different nutritional contents. The dietitian is interested in providing atleast the minimum daily requirements (MDR) of each of three vitamins in this one meal. The table below summarizes the vitamin content per ounce of each type of food, the cost per ounce of each food and MDR for the three vitamins. Any combination of the three foods may be selected as long as the total serving size is atleast 9 ounces. The problem is to determine the number of ounces of each food to be included in the meal. The objective is to minimize the cost of each meal subject to satisfying the MDR requirements of the three vitamins as well as the restriction on minimum serving size. Formulate the linear programming model for this problem. (Note: Only give complete formulation).

	Vitamin (mg)			
Food	1	2	3	Cost per ounce ($)
1	50	20	10	0.10
2	30	10	50	0.15
3	20	30	20	0.12
MDR	290	200	210	

Q.2. Transform the following set into the standard form required by the simplex method.

$x_1+x_2 \leq 100$

$2x_1+3x_2 \geq 40$

$x_1-2x_2 = 25$

$x_1, x_2 \geq 0$

Q.3. Evaluate the following:

(i) Lim $x \to -5$ $\{x/(x^2+10)\}$ (ii) Lim $x \to -2$ $(3x^2-4x+10)$ (iii) Determine the values which make the given function discontinuous: $f(x)= 1/(x^3-x)$ (iv) Determine the general expression for the difference quotient of the function $y=f(x)=x^2$ (v) Find all higher order derivatives for $f(x)=25.693$

Examine the following function for any critical points and determine their nature: $f(x)= -x^5$

Q.5. Determine the following:

i. $\int xe^x\,dx$
ii. $\int \{6x/(3x^2-10)\}\,dx$
iii. $\int 67\,dx$
iv. The marginal revenue function for a company's product is $MR=40,000-4x$ (x= number of units sold). If total revenue equals zero when no units are sold, determine the total revenue function for the product.
v. $\int \ln x\,dx$

End of Paper

KARACHI UNIVERSITY BUSINESS SCHOOL

University of Karachi

FINAL EXAMINATION DECEMBER 2010: AFFILIATED COLLEGES

BUSINESS MATHEMATICS – II BA (H) – 322

BS – II

Instructions:

1. Attempt all questions in sequence/ all questions carry equal marks.
2. Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.

Date: Dec 22, 2010 Time: 3 Hours Max. Marks: 60

Q.1. Attempt the following:

(i) Differentiate Continuous function and discontinuous function
(ii) Differentiate Tangent line and secant line
(iii) The slope of a pure horizontal line is _____
(iv) Discuss the application of linear programming from a business perspective
(v) Differentiate between Transportation model and assignment model

Q.2. Solve the following linear programming problem by the corner point method.

Maximize $z = 20x_1 + 15x_2$

Subject to
$$3x_1 + 4x_2 \leq 60$$
$$4x_1 + 3x_2 \leq 60$$
$$x_1 \leq 10$$
$$x_2 \leq 12$$
$$x_1, x_2 \geq 0$$

Q.3. Determine the location and values of the absolute maximum and absolute minimum for the following function and also sketch the function: $f(x) = 2x^2 - 4x + 5$ where $2 \leq x \leq 8$

Q.4(a) Integrate the following:

i. $\int x^{-1}\, dx$
ii. $\int (x^2 - 2x)^5 (x-1)\, dx$
iii. $\int 2xe^x\, dx$
iv. $\int (3x^2 - 10)\, dx$
v. $\int \ln x\, dx$

Q.4(b) Determine discontinuities (if any)

(i) $f(x) = 4x/x^3$ (ii) $f(x) = 4x^3/2$
(iii) $f(x) = 23.76$ (iv) $f(x) = 2x^4 + 4x^3 + 1.5x + 12$

Q.5(a) Determine $f'(x)$ for the following:

(i) $f(x) = (x^2 - 5)(x - x^3)$
(ii) $f(x) = e^{2x}$
(iii) $f(x) = \ln (5x^2 - 2x + 1)$
(iv) $f(x) = e^x / x$
(v) $f(x) = (10 - x)/(x^2 + 1)$

Q.5(b) A ball thrown upwards from the roof of a building which is 600 feet high will be at a height of h feet after t seconds, as described by the function: $h = f(t) = -16t^2 + 50t + 600$

i. What is the height of the ball after 3 seconds
ii. What is the velocity of the ball after 3 seconds
iii. What is the acceleration of the ball at t = 0? At t = 5?

BS FOUR YEARS PROGRAM

KARACHI UNIVERSITY BUSINESS SCHOOL
University of Karachi

FINAL EXAMINATION JUNE 2010; AFFILIATED COLLEGES
BUSINESS MATHEMATICS – II BA (H) – 322
BS – II

Date: June 15, 2010 Max Time: 3 Hrs
Instructions: Attempt all questions Max Marks: 60

Q1. Define the following

i. A Function
ii. Domain of a function
iii. Area under the curve y=f(x) from a to b
iv. Differential equation
v. Slope of a line passes through two points
vi. Critical points
vii. Inflection points
viii. Continuous function
ix. Differentiable function
x. Definite Integral
xi. Limit of a function
xii. Feasible solution

Q2 (a) Using limit approach find f`(x) if (x) $=x^3-3x^2$

Q2 (b) The demand for the product of a firm varies with the price that the firm charges for the product. The firm estimates the annual total revenue R (stated is $1,000) is a function of the price p (stated in $).

$$R = \frac{2p^3}{3} - \frac{15p^2}{2} + 28p + 100$$

i. Determine the price should be charged in order to maximize total revenue.
ii. What is the maximum value of annual total revenue?

Q3 (a) Find f'(2), f''(2) if $f(x) = \frac{e^{3x}}{x^2-1}$

Q3 (b) Solve the Differential Equation

$f''(x) = x - 5$, $f'(2) = 4$, $f(0) = 10$

Q4 Integrate the following

i. $\int x\, e^{2x}\, dx$

ii. $\int (\ln x)^2$

iii. $\int x\sqrt{x+1}\,dx$

Q5 Graph the region of feasible solution of the following L. P. problem and solve by the corner point method

Maximize $z = 4x_1 + 8x_2$

Subject to $2x_1 + x_2 \le 30$

$x_1 + 2x_2 \le 24$

$x_1, x_2 \ge 0$

KARACHI UNIVERSITY BUSINESS SCHOOL

University of Karachi

FINAL EXAMINATION, DECEMBER 2009; AFFILIATED COLLEGES

BUSINESS MATHEMATICS BA (P) – 322

BS-II

FOUR Years Program

Date: December 21, 2009

Max Marks: 60
Max Time: 3 Hours

Instructions:

1. Attempt all questions in sequence preferably but not necessary
2. All questions carry equal marks.
3. Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.
4. Financial tables of any kind shall not be provided

Q.No.1 Differentiate between the following using supportive examples:

a) Real Number and complex number
b) Continuous function and discontinuous function
c) Tangent line and secant line
d) Differentiation and Integration
e) Inflection point and critical point

Q.No.2(a)

a) Find dy/dx if y= f(u)=5u+3 and u=g(x)= -3x+10
b) $f(x)= x^2 -2x+5$
c) $f(x)=\ln(3x)$
d) $f(x)= (x^3--5)^4$
e) $f(x)= (x-1)/\ln 3x$

Q.No.2 (b) The population of a country is estimated by the function

$$P = 125\, e^{0.035t}$$

Where P equals the population (in million)& t equals time measured in years since 1990.

(i) What is the population expected to equal in the year 2000?
(ii) Determine the expression for the instantaneous rate of change in the population.
(iii) What is the instantaneous rate of change in the population expected to equal in the year 2000?

Q.No.3 Examine the function for any critical point and determine their nature also sketch the function.

$$f(x)= (x^4/4) - (9x^2/2)$$

Q.No.4(a) The function describing the marginal profit from producing and selling a product is **MP=-6x+450,** where x equals the number of units and MP is the marginal profit measured in dollars. When 100 units are produced and sold total profit equals $ 5,000. Determine the total profit function.

Q.No.4(b) Integrate the following:

i. $\int x^2/2\ dx$
ii. $\int (3x-6)\ dx$
iii. $\int \sqrt{(x-30)}\ dx$
iv. $\int (x^4 -2x^3+2)\ dx$
v. Classify the following differential equation by order and degree.

a. $dy/dx= x^2-2x+1$

b. $d^2y/dx^2 - (dy/dx)=x$

Q.No.5 Solve the following linear programming problem by the corner point method.

$$\text{Maximize } z = 4x_1 + 8x_2$$
$$\text{Subject to } x_1 + x_2 \le 20$$
$$2x_1 + x_2 \le 32$$
$$x_1, x_2 \ge 0$$

Name:_____ Enrolment No._____

University of Karachi
Department of Business Administration
BS -II
Final Examination: Affiliated Colleges
BUSINESS MATHEMATICS – II BA(H)-322

BS FOUR YEARS PROGRAM

Instructions:

1. Attempt all questions in sequence preferably but not necessary
2. All questions carry equal marks.
3. Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.
4. Financial tables of any kind shall not be provided

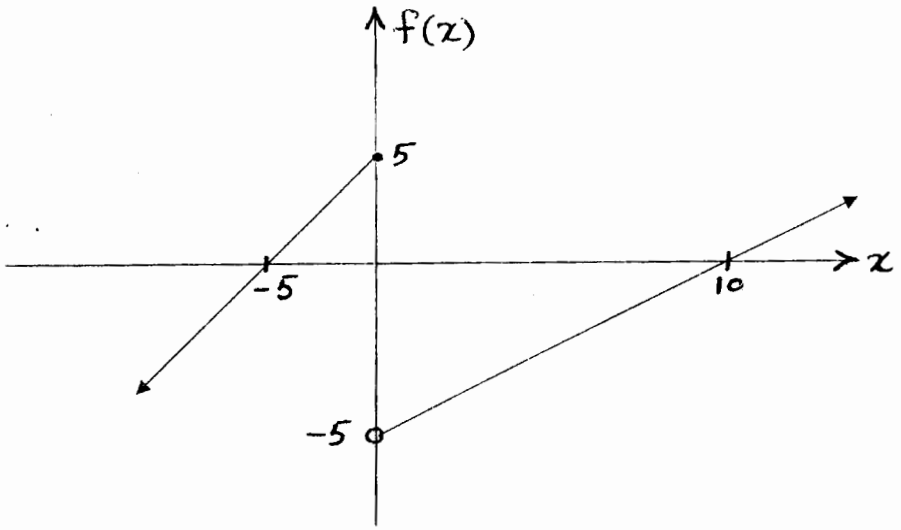
Dated: Jun 11 , 2009 Time: 180 Minutes Max. Marks: 60

Q.1. Solve the following linear problem by using the simplex method.

Maximize $z = 2x_1+12x_2+8x_3$
Subject to $2x_1+2x_2+x_3 \le 100$
$x_1-2x_2+5x_3 \le 80$
$10x_1+5x_2+4x_3 \le 300$
$x_1, x_2, x_3 \ge 0$

Q.2.(a) use the graph of the function given below to determine the indicated limits.

(i) limf(x) $x \to -5^-$ (ii) limf(x) $x \to -5^+$ (iii) limf(x) $x \to -5$ (iv) limf(x) $x \to 0^-$ (v) limf(x) $x \to 0^+$ (vi) limf(x) $x \to 0$



(2)

Q.2(b) Find the indicated limits

(i) $\lim_{x \to 0} 175$ (ii) $\lim_{x \to \infty} (-3x)/(5x+100)$ (iii) $\lim_{x \to -\infty} (100-3x^3)/(-x^3)$

Q.3(a)A ball is thrown straight up into the air. The height of the ball can be described as a function of time according to the function

$\mathbf{h(t)= -16t^2+128t}$

Where h(t) is height measured in feet and t is time measured in seconds.

(i) Determine the average rate of change in height between t=0 and t=2. Between t=0 and t=4. Between t=0 and t=8.

(ii) How long does it take for the ball to hit the ground (h=0)?

Q.3(b) Determine all higher order derivatives.

(i) $\mathbf{f(x)= e^{x^2-2x+5}}$

(ii) $\mathbf{f(x)=\sqrt{(x-1)^5(6x-5)}}$

(iii) $\mathbf{f(x)=\ln(5x)}$

(iv) $\mathbf{f(x)=10e^{x^2}}$

(v) $\mathbf{f(x)= (x^3-3x+5)^4}$

Q.4. Examine the following function for any critical point and determine their natures also present a sketch of the graph of the function

$\mathbf{f(x)= -x^5}$

Q.5.The annual profit for a firm depends upon the number of units produced. Specifically the function which describes the relationship between profit 'P' (stated in Pak Rupees) and the number of units produced 'x' is.

$\mathbf{P= -0.01x^2+5000x-25000}$

(i) Determine the number of units 'x' which will result in maximum profit

(ii) What is the expected maximum profit?

Q.6 (a) A particular prescription drug was administered to a person in a dosage of 100mg. The amount of the drug content in the blood stream diminishes over time is described by an exponential decay function. After 6 hours, a blood sample reveals that the amount in the system is 40mg. If V equals the amount of the drug in the blood stream after t hours and V_0 equals the amount in the blood stream at t=0, then state the particular function describing the drug level decay function.

Q.6(b) Find the general and particular solution for the following differential equations.

(i) $\mathbf{dy/dx=2x, f(0)= -50}$

(ii) $\mathbf{d^2y/dx^2=6x-9, f'(2)=10, f(-2)= -10}$

BS Four Years Program

KARACHI UNIVERSITY BUSINESS SCHOOL
UNIVERSITY OF KARACHI
FINAL EXAMINATION, DECEMBER 2008: AFFILIATED COLLEGES
BUSINESS MATHEMATICS – II: BA (H) – 322
BS – II

Date: December 23, 2008 Max Marks: 60
Time allowed: 3 Hours

Instructions:

1. Attempt all questions in sequence preferably but not necessary
2. All questions carry equal marks.
3. Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.
4. Financial tables of any kind shall not be provided

Dated: Dec 23, 2008 Time: 180 Minutes Max. Marks: 60

Q.1. Solve the following:

a) $x-3 = (3x-9)/3$

b) $3x^2 = 27$

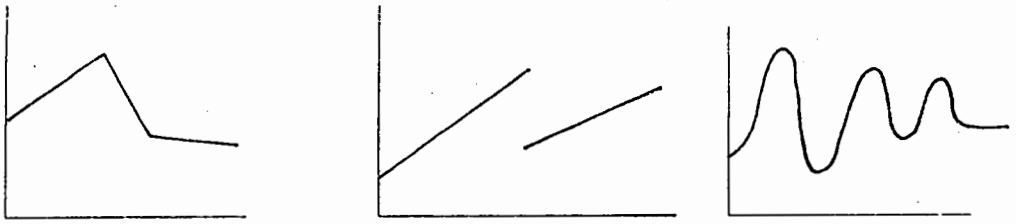
c) Sketch the function: $2x + 3y = 0$

d) Identify the following as continuous or discontinuous function:

i. $2x^3+4x^2+3x+2=72$

ii. $f(x)= x/(x+4)$

iii. Identify the following graphical functions as continuous or discontinuous:



e) Determine the limit of the function: $\lim_{x\to 4} [(x^2-5)(x+1)]$

f) Define the following:

i. Tangent line

ii. Secant line

Q.2.(a) Determine $f'(x)$ for the following:

i. $f(x) = x^{-3}$

ii. $f(x) = e^{2x}$

iii. $f(x) = \ln(4x^2-3x+3)$

iv. $f(x) = \sqrt{x^5}$

v. $f(x) = (x^2-5)(x- x^3)$

Q.2(b) Find all higher-order derivatives:

i. $f(x)= x^5+2x^3$

ii. $f(x) = e^x$

iii. $f(x)= 200514.231$

Q.3.(a) For the following function use $f''x$ to determine the concavity conditions at $x = 2$ and $x = 1$

(i) $f(x)=x^2- 4x+9$ (ii) $f(x)= \sqrt{4x-10}$ (iii) $f(x)= e^x$

Q.3.(b) For the following function identify the location of any inflection point.

(i) $f(x) = (x-5)^3$ (ii) $f(x) = \ln x$ (iii) $f(x)=-10x^4+100$

Q.4 Examine the following function for any critical point and determine their nature. $f(x) = 2x^2 - 12x - 10$ Where $2 \leq x \leq 10$ also sketch the function

Q.5 A retailer of motorbike has examine cost data and determine a cost function which expresses the annual cost of purchasing, owning and maintaining inventory as function of the size (no. of the unit) of each order it places for the motorbike. The cost function is

$$C = f(q) = 4860/q + 15q + 750000$$

where C = annual inventory cost and q = no. of bicycle order each time.

Requirement:
(a) Determine the order size which minimize the annual inventory cost
(b) What is minimum annual inventory cost expected to equal

Q.6(a). Integrate the following

i. $\int (2x^2-3x+2)\, dx$
ii. $\int (x^2-3x)^4 (x-1) dx$
iii. $\int -52x\, dx$
iv. $\int (x^4-2x)^4 (4x^2-4)\, dx$
v. $\int (x-1)/(4x^2-8x+10)\, dx$

Q.6(b) An LP problem has 15 decision variables, 20 ($\leq$) constraints, 12 ($\geq$) constraints and 8 ($=$) constraints. When rewritten in standard form, how many variables will be included? How many supplemental variables of each type.

Name:_____ Enrolment No._____

(1)

University of Karachi
Department of Business Administartion
BBA (First Year Second Semester)
Final Examination: Affiliated Colleges
BUSINESS MATHEMATICS – II BA(P) 342)

Instructions:

1. **Attempt all questions in sequence/ all questions carry equal marks.**
2. **Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.**

Dated: Dec 12, 2006 Time: 180 Minutes Max. Marks: 60

Q.1(a) Graphically determine the permissible half- space which satisfies the inequality

(i) $-x + 2y \geq -8$ (ii) $-2x + 6y \leq 24$

(b) Graphically determine the solution space(if exists)

(i) $2x - 4y \leq 20$
$3x + 2y \leq 32$

(ii) $5x + 2y \leq 20$
$3x + 4y \leq 32$

(c) Describe the following:(Illustrate graphically where necessary)

(i) Optimal solution
(ii) Alternative optimal solution
(iii) Unbounded solution

(d) Refer to the diagram at the end of this paper and answer the questions

Q.2(a) Solve the following linear programming problem by the corner point method.

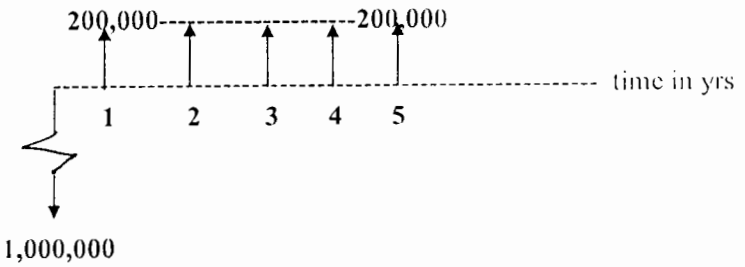
Maximize $z = 20x_1 + 15x_2$

Subject to
$$3x_1 + 4x_2 \leq 60$$
$$4x_1 + 3x_2 \leq 60$$
$$x_1 \leq 10$$
$$x_2 \leq 12$$
$$x_1, x_2 \geq 0$$

Q.2(b) Given the above LP problem rewrite the constraint set into standard form incorporating all supplemental variables.

Q.3(a) A person recently won a lottery. The terms of the lottery are that the winner will receive annual payments of Rs20, 000 at the end of this year and each of the following 3 yrs. If the winner could invest money today at the rate of 8 percent per year compounded annually what is the present value of the four payments.

Q.3(b) Determine whether the investment project depicted by the cash flow diagram satisfies the minimum desired rate of return criterion. What is the NPV at the indicated interest rate? (All amount are in Pak Rupees). Minimum rate of return=10% per yr



Q.4(a) Integrate the following:

i. $\int x^{-1}\,dx$

ii. $\int (x^2 - 2x)^5 (x-1)\,dx$

iii. $\int 2xe^{x^2}\,dx$

iv. $\int 6x / (3x^2-10)\,dx$

v. $\int f(x) = \ln (5x^2-2x+1)$

(vi) $\int f(x) = \dfrac{e^x}{x}$

Q.4(b) Determine discontinuities (if any)

(i) $f(x) = 3/x^3$ (ii) $f(x) = x^3/4$

(iii) $f(x)=39.5$ (iv) $f(x,y) = 2x^4 + 4x^3 + 1.5x + 12y$

Q.5. A retailer of motorbike has examined cost data and determines a cost function which expresses the annual cost of purchasing, owning and maintaining inventory as function of the size (no. of the unit) of each order it places for the motorbike. The cost function is

$$C = f(q) = 4860/q + 15q + 750000$$

where C = annual inventory cost and q = no. of motorbike ordered each time.

Requirement:

(a) Determine the order size which minimize the annual inventory cost

(b) What is minimum annual inventory cost expected to equal?

Q.6. Determine the area indicated by $f(x) = 5x + 7$ between $x = 3$ and $x = -2$.

Q.7. For the function given below: $f(x)= 3x^2 - 48x + 100$

a) Determine the location of all critical points and determine their nature

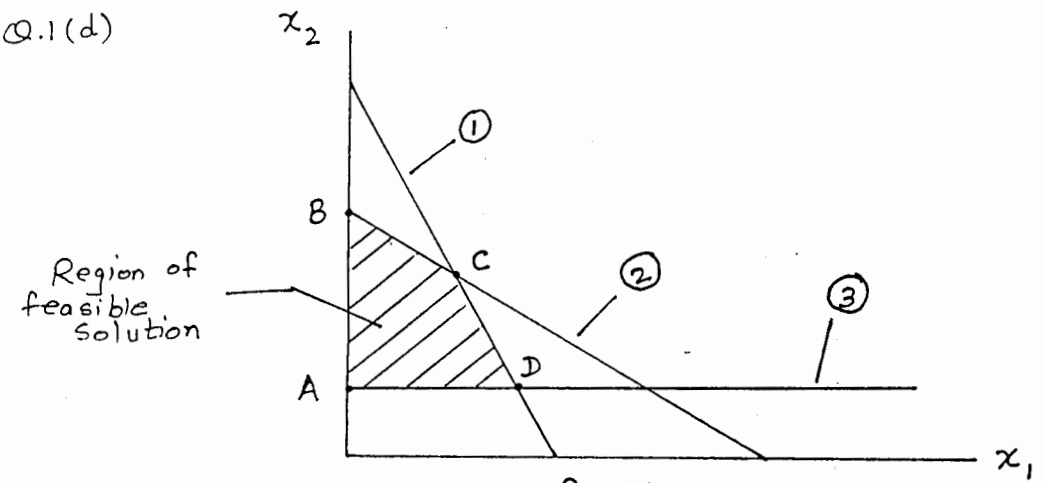
b) Sketch the graph of the function

c) Determine the location and values of the absolute maximum and absolute minimum for the following function.

$$f(x) = 2x^2 - 4x + 5$$

where $2 \le x \le 8$

Q.1(d)



For the given region of feasible solution :

(a) Identify the nature of each constraint

(b) How many basic & non-basic variables will be there in any basic feasible solution

(d) What are the basic & non-basic variables associated with corner points A, B, C & D.

(1)

Name: _____ Enrolment No. _____

KARACHI UNIVERSITY BUSINES SCHOOL
UNIVERSITY OF KARACHI

Final Examination : Affiliated Colleges

Business Mathematics – II BA(P) – 342

Dated : June 12, 2007 Max. Marks: 60
Time : 3hrs.

Instructions: Attempt all questions, all question carry equal marks.
Attempt question in sequence.

Q.1. Maximize $Z = 2x_1 + 12x_2 + 8x_3$

Subject to
$2x_1 + 12x_2 + x_3 \leq 100$
$x_1 + 2x_2 + 5x_3 \leq 80$
$10x_1 + 5x_2 + 4x_3 \leq 300$
$x_1 , x_2 , x_3 \geq 0$

Q.2. A beverage company has four plants in Karachi, Lahore, Peshawar and Quetta, and it must ship its finished product to its warehouses in Rawalpindi, Multan, Hyderabad, Faisalabad and Sukkur, the unite shipping cost, availabilities at the factories, and requirements at the warehouses are shown in table

	Multan	Hyd.	FBD.	Sukkur	RWP	Factories Available
Karachi	6	3	12	25	22	25
Lahore	10	8	7	50	15	60
Quetta	8	50	15	5	14	70
R.Pindi	22	17	15	24	40	45
Warehouse requirement	10	50	20	80	40	200

Find out the feasible solution (Transportation Prob.)

Q.3.(a) A new State welfare agency wants to determine how many analysts to hire for processing of welfare applications. It is estimated that the average cost "C" of processing an application is a function of the number of analysts 'x'

Specially the cost function is $C = f(x) = \frac{x^3}{3} - \frac{7x^2}{2} + 6x + 29$

i) If the objective is to minimize the average cost per application, determine the number of analysts who should be hired.

ii) What the minimum average cost of processing an application expected.

Q.3.(b) What will be the Present value of a continuous income stream of Rs.3500 per annum for four years, if it is discounted continuously at the rate of 0.05 per year.

Q.4.(a) The market demand law of a firm is given by $4p + q - 16 = 0$, find the output level when the revenue is maximum and find that maximum revenue.

(b) If $Z = \frac{x}{\sqrt{x^2 + y^2}}$ Find Partial derivatives of Z w.r.t. x and y respectively.

Q.5. Integrate

(i) $\int x^2 e^{3x} dx$

(ii) $\int \frac{3x^2 - 5x}{(2x^3 - 5x^2 + 15)^{\frac{3}{2}}} dx$

Q.6.(a) Determine the area bounded by the curve $y = \frac{1}{\sqrt{8 - x}}$ and x-axis and $x = \pm 8$.

(b) Given the demand function.

$q_1 = f(p_1, p_2, p_3) = 250{,}000 - 0.5p_1^2 + p_2^2 - 0.4\, p_3^2$

i) Determine the partial derivatives fp_1, fp_2 and fp_3.

ii) If $p_1 = 30$, $p_2 = 10$ and $p_3 = 20$, evaluate the partial derivatives and interpret their Meaning.

KARACHI UNIVERSITY BUSINESS SCHOOL

BBA 2nd Semester - 2005-06

Time: 3 Hours. **Business Mathematics II (C # 352)** **Max. Marks: 60**

ATTEMPT ALL QUESTONS, CARRY EQUAL MARKS.

Q. 1. Minimize $Z = 0.10x_1 + 0.15x_2 + 0.12x_3$

Subject

$$50x_1 + 30x_2 + 20x_3 \geq 290$$
$$20x_1 + 10x_2 + 30x_3 \geq 200$$
$$10x_1 + 50x_2 + 20x_3 \geq 210$$
$$x_1 + x_2 + x_3 \geq 9$$
$$x_1 + x_2 + x_3 \geq 0$$

Q. 2. A beverage company has four plants in Karachi, Lahore, Peshawar and Quetta, and it must ship its finished product to its warehouses in Rawalpindi, Multan, Hyderabad, Faisalabad and Sukkur, the unite shipping cost , availabilities at the factories, and requirements at the warehouses are shown in table

	Multan	Hyd.	FBD.	Sukkur	RWP	Factories Available
Karachi	6	3	12	4	22	25
Lahore	7	8	7	14	15	60
Quetta	8	4	5	17	14	70
R. Pindi	22	17	10	24	7	45
Warehouse requirement	10	50	20	80	40	200

Find out the feasible solution (Transportation Prob.)

Q.3(a) A new State welfare agency wants to determine how many analysts to hire for processing of welfare applications. It is estimated that the average cost "C" of processing an application is a function of the number of analysts 'x'

Specifically the cost function is $C = f(x) = \frac{x^3}{3} - \frac{7x^2}{2} + 6x + 29$

(i) If the objective is to minimize the average cost per application, determine the number of analysts who should be hired.

(ii) What the minimum average cost of processing an application expected.

(b) A ball is thrown straight up into the air. The height of the ball can be described as a function of time according to function $h(t) = -16t^2 + 128t$, where $h(t)$ is height measured in feet and 't' is time measured in seconds.

(i) What is the height 2 seconds after the ball is thrown?
(ii) When will the ball attain its greatest height?
(iii) When will the ball hit the ground?

Contd.....P/2.....

Q.4(a) (Minimize average cost per Unit) the post total cost of producing unit of certain product is described by the function.

$$C = 100{,}000 + 1{,}500q + 0.2q^2$$

Where C is the total cost stated in dollars. Determine the number of units of q that should be produced in order to minimize the average cost per unit.

(b) The function describing the marginal profit from producing and selling a product is $MP = -3x + 500$
Where x equal the number of unit and MP is the marginal profit measured in dollars when 200 units are produced and sold, total profit equals $ 15,000. determine the total profit function.

Q.5(a) Integrate (i) $\int \frac{(x+2)dx}{(2x^2+8x)^3}$ (ii) $\int x^2 \, In\, x \, dx$

(b) Determine the size of the area bounded by function, the X-axis over the indicated interval of $f(x) = 4xe^{x^2}$, between $x = 1$, and $x = 3$.

Enrolment No.

University of Karachi
Department of Business Administartion
BBA (First Year Second Semester)
Final Examination: Affiliated Colleges
BUSINESS MATHEMATICS – B BA(P) 342)

Instructions:

1. **Attempt all questions in sequence/ all questions carry equal marks.**
2. **Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.**

Dated: Dec 12, 2006 Time: 180 Minutes Max. Marks: 60

Q.1(a) Graphically determine the permissible half- space which satisfies the inequality

(i) $-x + 2y \geq -8$ (ii) $-2x + 6y \leq 24$

(b) Graphically determine the solution space(if exists)

(i) $2x - 4y \leq 20$
$3x + 2y \leq 32$

(ii) $5x + 2y \leq 20$
$3x + 4y \leq 32$

(c) Describe the following:(Illustrate graphically where necessary)

(i) Optimal solution
(ii) Alternative optimal solution
(iii) Unbounded solution

(d) Refer to the diagram at the end of this paper and answer the questions

Q.2(a) Solve the following linear programming problem by the corner point method.

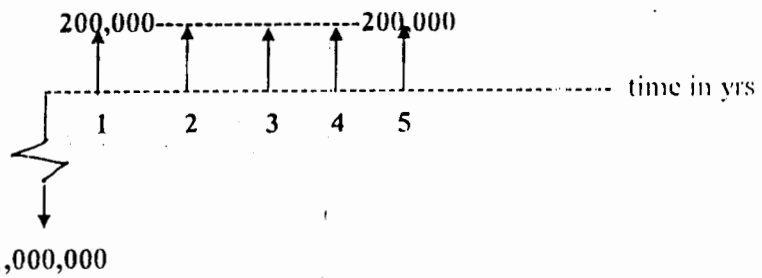
Maximize $z = 20x_1 + 15x_2$

Subject to
$$3x_1 + 4x_2 \leq 60$$
$$4x_1 + 3x_2 \leq 60$$
$$x_1 \leq 10$$
$$x_2 \leq 12$$
$$x_1, x_2 \geq 0$$

Q.2(b) Given the above LP problem rewrite the constraint set into standard form incorporating all supplemental variables.

Q.3(a) A person recently won a lottery. The terms of the lottery are that the winner will receive annual payments of Rs20, 000 at the end of this year and each of the following 3 yrs. If the winner could invest money today at the rate of 8 percent per year compounded annually what is the present value of the four payments.

Q.3(b) Determine whether the investment project depicted by the cash flow diagram satisfies the minimum desired rate of return criterion. What is the NPV at the indicated interest rate? (All amount are in Pak Rupees). Minimum rate of return=10% per yr



Q.4(a) Integrate the following:

i. $\int x^{-1}\, dx$

ii. $\int (x^2 - 2x)^5 (x-1)\, dx$

iii. $\int 2xe^{x^2}\, dx$

iv. $\int 6x / (3x^2-10)\, dx$

v. $\int f(x) = \ln (5x^2-2x+1)$

(vi) $\int f(x) = \dfrac{e^x}{x}$

Q.4(b) Determine discontinuities (if any)

(i) $f(x) = 3/x^3$ (ii) $f(x) = x^3/4$

(iii) $f(x)=39.5$ (iv) $f(x,y) = 2x^4 + 4x^3 + 1.5x + 2y$

Q.5. A retailer of motorbike has examined cost data and determines a cost function which expresses the annual cost of purchasing, owning and maintaining inventory as function of the size (no. of the unit) of each order it places for the motorbike. The cost function is

$$C = f(q) = 4860/q + 15q + 750000$$

where C = annual inventory cost and q = no. of motorbike ordered each time.

Requirement:

(a) Determine the order size which minimize the annual inventory cost

(b) What is minimum annual inventory cost expected to equal?

Q.6. Determine the area indicated by $f(x) = 5x + 7$ between $x = 3$ and $x = -2$.

Q.7. For the function given below: $f(x)= 3x^2 - 48x + 100$

a) Determine the location of all critical points and determine their nature

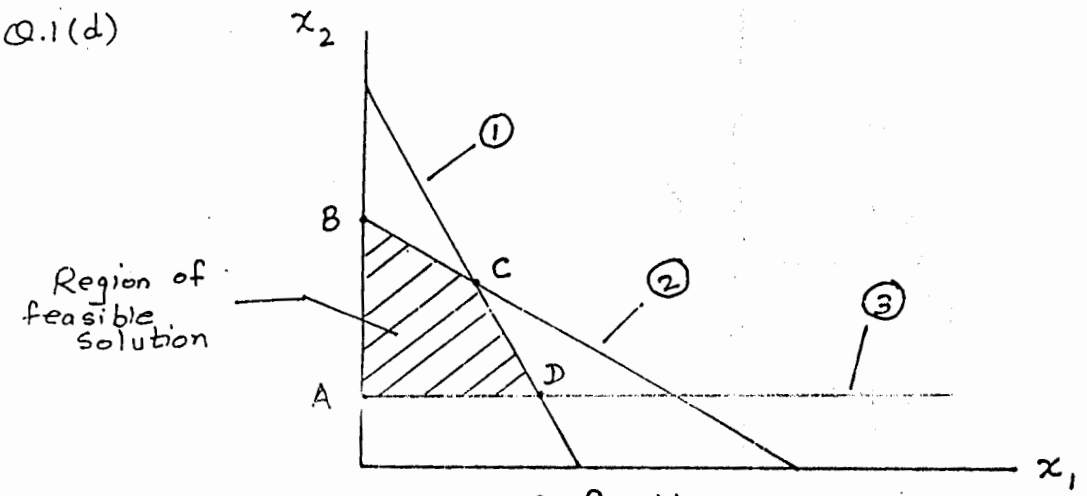
b) Sketch the graph of the function

c) Determine the location and values of the absolute maximum and absolute minimum for the following function.

$$f(x) = 2x^2 - 4x + 5$$

where $2 \leq x \leq 8$

Q.1(d)



For the given region of feasible solution:

(a) Identify the nature of each constraint

(b) How many basic & non-basic variables will be there in any basic feasible solution

(d) What are the basic & non-basic variables associated with corner points A; B, C & D.

University of Karachi
Department of Business Administartion
BBA (First Year Second Semester)
Final Examination: Affiliated Colleges
BUSINESS MATHEMATICS – II BA(P) 342)

Instructions:

1. **Attempt all questions in sequence/ all questions carry equal marks.**
2. **Exchange of stationary items/calculators & use of Mobile Phone is strictly prohibited.**

Dated: Dec 20, 2005 **Time: 180 Minutes** **Max. Marks: 60**

Q.1(a) Graphically determine the permissible half- space which satisfies the inequality

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(b) Graphically determine the solution space(if exists)

(i) $2x - 4y \leq 20$
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(ii) $5x + 2y \leq 20$
$3x + 4y \leq 32$

(c) Describe the following:(Illustrate graphically where necessary)

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(iii) Unbounded solution

Q.2 Solve the following linear programming problem by the corner point method.

Maximize $z = 20x_1 + 15x_2$

Subject to
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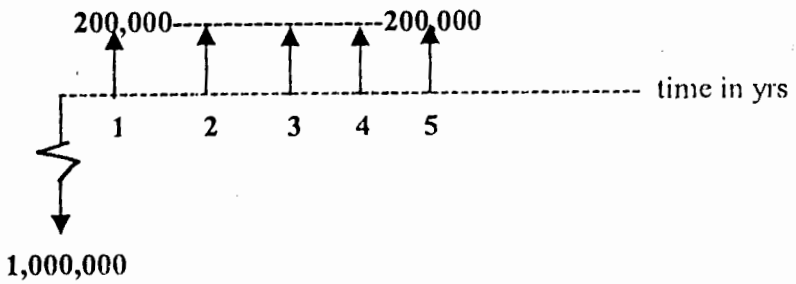
$4x_1 + 3x_2 \leq 60$
$x_1 \leq 10$
$x_2 \leq 12$
$x_1, x_2 \geq 0$

Q.3(a) A person recently won a lottery. The terms of the lottery are that the winner will receive annual payments of Rs20, 000 at the end of this year and each of the following 3 yrs. If the winner could invest money today at the rate of 8 percent per year compounded annually what is the present value of the four payments.

Q.3(b) Determine whether the investment project depicted by the cash flow diagram satisfies the minimum desired rate of return criterion. What is the NPV at the indicated interest rate? (All amount are in Pak Rupees). Minimum rate of return=10% per yr



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iv. $6x / (3x^2-10)\,dx$

Q.4(b) Determine discontinuities (if any)

(i) $f(x) = 3/x^3$ (ii) $f(x) = x^3/4$

(iii) $f(x)=39.5$ (iv) $f(x,y) = 2x^4 + 4x^3 + 1.5x + 12y$

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Q.6. Determine the area indicated by $f(x) = x + 5$ between $x = 3$ and $x = -2$. (by both the metho

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a) Determine the location of all critical points and determine their nature

b) Sketch the graph of the function

c) Determine the location and values of the absolute maximum and absolute minimum for the following function.

$$f(x) = 2x^2 - 4x + 5$$

where $2 \leq x \leq 8$

(1)

Name: _____ Enrolment No. _____

KARACHI UNIVERSITY BUSINES SCHOOL
UNIVERSITY OF KARACHI

Final Examination : Affiliated Colleges

Business Mathematics – II BA(P) – 342

Dated : June 12, 2007 Max. Marks: 60
Time : 3hrs.

Instructions: Attempt all questions, all question carry equal marks.
Attempt question in sequence.

Q.1. Maximize $Z = 2x_1 + 12x_2 + 8x_3$

Subject to
$2x_1 + 12x_2 + x_3 \leq 100$
$x_1 + 2x_2 + 5x_3 \leq 80$
$10x_1 + 5x_2 + 4x_3 \leq 300$
$x_1, x_2, x_3 \geq 0$

Q.2. A beverage company has four plants in Karachi, Lahore, Peshawar and Quetta, and it must ship its finished product to its warehouses in Rawalpindi, Multan, Hyderabad, Faisalabad and Sukkur, the unite shipping cost, availabilities at the factories, and requirements at the warehouses are shown in table

	Multan	Hyd.	FBD.	Sukkur	RWP	Factories Available
Karachi	6	3	12	25	22	25
Lahore	10	8	7	50	15	60
Quetta	8	50	15	5	14	70
R.Pindi	22	17	15	24	40	45
Warehouse requirement	10	50	20	80	40	200

Find out the feasible solution (Transportation Prob.)

Q.3.(a) A new State welfare agency wants to determine how many analysts to hire for processing of welfare applications. It is estimated that the average cost "C" of processing an application is a function of the number of analysts 'x'

Specially the cost function is $C = f(x) = \frac{x^3}{3} - \frac{7x^2}{2} + 6x + 29$

i) If the objective is to minimize the average cost per application, determine the number of analysts who should be hired.

ii) What the minimum average cost of processing an application expected.

Q.3.(b) What will be the Present value of a continuous income stream of Rs.3500 per annum for four years, if it is discounted continuously at the rate of 0.05 per year.

Q.4.(a) The market demand law of a firm is given by $4p + q - 16 = 0$, find the output level when the revenue is maximum and find that maximum revenue.

(b) If $Z = \frac{x}{\sqrt{x^2 + y^2}}$ Find Partial derivatives of Z w.r.t. x and y respectively.

Q.5. Integrate

(i) $\int x^2 e^{3x} dx$

(ii) $\int \frac{3x^2 - 5x}{(2x^3 - 5x^2 + 15)^{\frac{3}{2}}} dx$

Q.6.(a) Determine the area bounded by the curve $y = \frac{1}{\sqrt{8 - x}}$ and x-axis and $x = \pm 8$.

(b) Given the demand function.

$q_1 = f(p_1, p_2, p_3) = 250{,}000 - 0.5p_1^2 + p_2^2 - 0.4\, p_3^2$

i) Determine the partial derivatives fp_1, fp_2 and fp_3.

ii) If $p_1 = 30$, $p_2 = 10$ and $p_3 = 20$, evaluate the partial derivatives and interpret their Meaning.