



PRESIDENCY UNIVERSITY,
BENGALURU

SCHOOL OF MANAGEMENT

SET A

MID TERM EXAMINATION

Odd Semester: 2018-19

Date: 30 October 2018

Course Code: MGT 105

Time: 2 Hours

Course Name: Mathematics for Managers

Max Marks: 40

Branch & Sem: MBA & I Sem

Weightage: 20%

Instructions:

- (i) Students are allowed to use scientific calculators
- (ii) Graph sheets will be provided on request

Part A

Answer **all** the Questions. **Each** question carries **three** marks. (4x3=12)

1. Define the slope and intercept of a straight line.
2. Plot the line on a graph given slope =2 and Y intercept =1
3. Obtain the vertical and horizontal intercepts for the equation $y=mx+c$
4. Calculate the slope of a line given the following two points on the line (4,2) and (3,6).

Part B

Answer **all** the Questions. **Each** question carries **four** marks. (3x4=12)

5. For each of the following lines

(i) $y = 20 - 5x$

(ii) $y = 5 + 20x$

Calculate the slopes and intercepts.

6. Graph the straight line given the points (3,6) and (-2,6) and determine the equation of the line thus obtained.
7. Find the equation of the line which passes through the point (3,5) and has a slope of 2.

Part C

Answer **all** the Questions. Each Question carries **eight** marks.

(2x8=16)

8. The equation of a demand function is given by $Q = 40 - 0.5 P$
- (i) Plot the demand function with Q on the vertical axis
 - (ii) What is the change in demand (Q) when price (P) increases by 1 unit?
 - (iii) What is the demand when $P=0$?
 - (iv) what is the price when $Q=0$?
9. a. The variable cost of a product increases by Rs.5 for each unit produced while fixed costs are Rs.50.
- (i) Write down the equation of the total cost function.
 - (ii) Graph the total cost function
- b. A firm sells its product at Rs.10 per unit.
- (i) Write down the equation of the total revenue function.
 - (ii) What is the revenue when 10 units are sold?



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SET B

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Time: 2 Hours

Course Name: Mathematics for Managers

Max Marks: 40

Branch & Sem: MBA & I Sem

Weightage: 20%

Instructions:

- (i) Use graph paper wherever required.
- (ii) Use of pencil and scale is expected for graph.
- (iii) Use of non-programmable calculator is allowed.

Part A

Answer **all** the Questions. **Each** question carries **three** marks. (4x3=12)

1. What is the difference between linear and non-linear equations?
2. How to define a straight line?
3. Plot the line given the slope = 1 and intercept = 2.
4. Determine which of the following points lie on the demand function, $Q = 50 - 0.5 P$
Points (P, Q): A = (90, 5), B = (8, 10), C = (70, 15)

Part B

Answer **all** the Questions. **Each** question carries **four** marks. (3x4=12)

5. Plot the points (-2, 0), (0, 2), (2, 4), (4, 6), and (5, 7) on a graph. Measure the slope and intercept of the plotted line.
6. A line has the equation $y = 2x - 1$. Plot the line over the interval $x = -2$ to $x = 3$.
7. Given the equation of the line, $2y - 5x + 10 = 0$
 - a) Write the equation in the form of $y = mx + c$
 - b) Plot the straight line on a graph.
 - c) From the graph, how would you determine whether the slope is positive or negative?

Part C

Answer **all** the Question. **Each** question carries **eight** marks.

(2x8=16)

8. The demand function is given by the equation $P = 500 - 0.5Q$
- a) State and give a verbal description of the slope and intercepts.
 - b) What is the quantity demanded when $P = 15$.
 - c) Plot the demand function on a graph for $0 \leq Q \leq 200$.
9. Suppose that each tool box is sold for Rs. 350 irrespective of the number of units sold.
- a) Write down the equation of the total revenue function.
 - b) Graph the total revenue function.



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Course Code: MGT 105

Time: 2 Hours

Course Name: Mathematics for Managers

Max Marks: 40

Branch & Sem: MBA & I Sem

Weightage: 20%

Instructions:

- (i) Students are allowed to use scientific calculators
- (ii) Graph sheets will be provided on request
- (iii)

Part A

Answer **all** the Questions. **Each** question carries **three** marks.

(4x3=12)

1. If we convert the general form of equation of the straight line $Ax + By + C = 0$ to the intercept form $\frac{x}{a} + \frac{y}{b} = 1$, express intercepts a and b in terms of A, B and C
2. Find the equation of the line given its y intercept =3 and slope = 2. Find its x intercept.
3. The owner of a milk store finds that he can sell 900 liters of milk each week at Rs 15 per liter and 1000 liters of milk each week at Rs 16 per liter. Assuming a linear relationship between selling price and demand, how many liters of milk he can sell per week at Rs 18 per liter?
4. The population in the year 1985 was 92 crores and in the year 1995 it was 97 crores. Assuming linear relationship between year and population, draw a graph of population versus years, taking population on a -axis and years on x -axis. Find the population for the year 2015.

Part B

Answer **all** the Questions. **Each** question carries **four** marks.

(3x4=12)

5

- (i) The minimum taxi fare is Rs 50 for first 4 kilometers and after 4 kilometers, it is Rs 15 per kilometer. Write the equation for the fare y for x kilometers of distance travelled.

(ii) A library charges fixed charge of Rs c up to first week and afterwards Rs 1 per day as the lending charges. If a student borrows a book for 30 days, the student pays Rs 30 as the total lending charges. Write the equation of total library charge y to borrow a book for x number of days. Find the value of c .

6. Graph the straight line given the points (2, 2) and (3, 3) and write the equation of this line and find its slope, x intercept and y intercept.

7. Find the equation of the line which has an x intercept 2 and has a slope of 2. Find the y Intercept of this line.

Part C

Answer **all** the Questions. Each Question carries **eight** marks.

(2x8=16)

8. The equation of a demand function is given by $P = 2400 - 0.5 Q$
Determine the point of elasticity of demand

- i) when $P=1800$
- ii) when $P=1200$
- iii) when $P=600$

For each of the above case, state whether demand is elastic, unit elastic or inelastic.

9. A person has an amount of 500 in his purse and plans to buy a combination of oranges and apples for all the money in his purse. His options are, he can buy either only apples, or only oranges, or a combination of both. The price of oranges is Rs 50 per *kg* and the price of apples is Rs 100 per *kg*. Denoting apples in *kg*'s along y axis and oranges in *kg*'s along x axis draw a straight line of orange versus apples and write the equation for the same.

Show how the line changes when,

- i) The price of apple remains 100 per *kg*, but price of orange changes to Rs 60 per *kg*.
- ii) The price of apple changes to Rs 90 per *kg* but the price of apple remains same.
- iii) Both the price of apple and the orange remains fixed at Rs 100 and Rs 50 per *kg*, but the person has Rs 600.

Write the equation in each of the above cases.



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Course Code: MGT 105

Time: 2 Hours

Course Name: Mathematics for Managers

Max Marks: 40

Branch & Sem: MBA & I Sem

Weightage: 20%

Instructions:

- (i) Students are allowed to use scientific calculators
- (ii) Graph sheets will be provided on request

Part A

Answer **all** the Questions. **Each** question carries **three** marks.

(4x3=12)

1. If we convert the intercept form of equation to straight line $\frac{x}{a} + \frac{y}{b} = 1$ to the General form $Ax + By + C = 0$, express A , B and C in terms of intercepts a and b
2. Find the equation of the line given its x -intercept =3 and slope = 2. Find its y intercept.
3. The owner of a milk store finds that he can sell 1000 liters of milk each week at Rs 15 per liter and 1200 liters of milk each week at Rs 16 per liter. Assuming a linear relationship between selling price and demand, how many liters of milk he can sell per week at Rs 18 per liter?
4. The population in the year 1985 was 92 crores and in the year 1995 it was 97 crores. Assuming linear relationship between year and population, draw a graph of population versus years, taking population on y -axis and years on x -axis. Find the population for the year 2010.

Part B

Answer **all** the Questions. **Each** question carries **four** marks.

(3x4=12)

5

- (i) The minimum Auto rickshaw fare is Rs 25 for first 4 kilometers and after 4 kilometers, it is Rs 12 per kilometer. Write the equation for the fare y for x kilometers of distance travelled.

(ii) A library charges fixed charge of Rs 2 for the first week and afterwards Rs 1 per day as the lending charges. Write the equation of total library charge y to borrow a book for x number of days. If a student borrows a book for 30 days, find the library charges the student has to pay to the library.

6. Graph the straight line given the points (1, 2) and (2, 3) and determine the equation of the line thus obtained.

7. Find the equation of the line which has an x-intercept 2 and has a slope of 2.

Part C

Answer **all** the Questions. **Each** Question carries **eight** marks.

(2x8=16)

8. The equation of a demand function is given by $P = 2400 - 0.5 Q$
Determine the point of elasticity of demand

- i) when $P=600$
- ii) when $P=1200$
- iii) when $P=1800$

For each of the above case, find whether demand increase or decrease if the price is increased.

9. A person has an amount of Rupees 1000 in his purse and plans to buy a combination of oranges and apples for all the money in his purse. His options are, he can buy either only apples, or only oranges, or a combination of both. The price of oranges is Rs 50 per kg and the price of apples is Rs 100 per kg . Denoting apples in kg s along x axis and oranges in kg s along y -axis draw a straight line of orange versus apples and write the equation for the same.

Show how the line changes when,

- i) The price of apple remains is 100 per kg, but price of orange changes to Rs 60 per kg.
- ii) The price of apple changes to Rs 90 per kg but the price of orange remains same.
- iii) Both the price of apple and the orange remains fixed at Rs 100 and Rs 50 per kg, but the person has only Rs 600.

Write the equation in each of the above cases.

Roll No.

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**PRESIDENCY UNIVERSITY
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SCHOOL OF MANAGEMENT

SET A

END TERM FINAL EXAMINATION

Odd Semester: 2018-19

Course Code: MGT 105

Course Name: Mathematics for Managers

Programme & Sem: MBA & I Sem

Date: 11 January 2019

Time: 3 Hours

Max Marks: 80

Weightage: 40%

Instructions:

- (i) *Students are allowed to use scientific calculators and statistical tables*
- (ii) *Graph sheets will be provided on request*

Part A

Answer **any four** Questions. **Each** question carries **five** marks.

(4Qx5M=20)

1. Define the slope and intercept of a straight line. Give examples.
2. Given the equations of the following lines
 - (a) $2y - 5x + 10 = 0$ (b) $x = 10 - 2y$
 - (i) Write each of the equations in the form $y = f(x)$
 - (ii) Obtain the slopes of the equations
3. Solve:
 - (i) $3^x \times 3^{x+1} = \sqrt{9}$ (ii) $\sqrt{t-3} = 2$
4. Differentiate the following w.r.t. x
 - (i) $y = \frac{1}{x^2}$ (ii) $y = \frac{5}{x^2}$
5. Define and give examples for
 - (i) matrix (ii) null matrix

Part B

Answer **any three** Questions. **Each** question carries **ten** marks.

(3Qx10M=30)

6. Solve the following simultaneous equations.

- (i) $5x - 2y = 11$ (ii) $y = 2x + 3$
- $3x + 3y = 15$ $y = 7 - 2x$

7. The supply and demand functions for a particular market are given by the equations

$$P_s = Q^2 + 7Q + 10 \quad \text{and} \quad P_d = Q^2 - 11Q + 46$$

- (i) Sketch the graph of each function on the same graph over the interval $Q = 0$ to 5 .
- (ii) Find the equilibrium price and quantity graphically and algebraically.

8. A firm has the following cost function $TC = 6Q$

- (i) What is the value of the fixed costs?
- (ii) Graph the total cost function
- (iii) What is the total cost when $Q = 11$
- (iv) What is the cost of producing each additional unit of this good.

9. Given $A = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 3 \\ 1 & 0 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 4 & 5 \\ 3 & 2 & 0 \\ 1 & 2 & 3 \end{bmatrix}$

Compute (i) AB (ii) BA

Part C

Answer **any two** Questions. **Each** question carries **fifteen** marks.

(2Qx15M=30)

10. The demand function for a monopolist is $Q = 100 - 3P$

- (i) Find expressions for TR, MR, and AR.
- (ii) Evaluate TR, MR, and AR at $Q = 16$

11. Find the maximum and / or minimum values for the function $y = x^3 - 3x^2 - 9x$

12. Use Cramer's rule to solve the simultaneous equation

$$P = 100 - 8Q \quad , \quad P = 30 + 5Q$$

Roll No.

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SET B

END TERM FINAL EXAMINATION

Odd Semester: 2018-19

Date: 11 January 2019

Course Code: MGT 105

Time: 3 Hours

Course Name: Mathematics for Managers

Max Marks: 80

Programme & Sem: MBA & I Sem

Weightage: 40%

Instructions:

- (i) *Use of scientific calculator is allowed.*
- (ii) *Use graph paper for question number 10.*

Part A

Answer **any four** Questions. **Each** question carries **five** marks.

(4Qx5M=20)

1. Find the equations of the following straight lines:

- a) A straight line passes through the point (2, 4) and has a slope of 1.
- b) A straight line passes through the points (2, 4) and (8, 16).

2. Given the simultaneous equations:

$$2X + Y - Z = 4$$

$$X + Y - Z = 3$$

$$2X + 2Y + Z = 12$$

Find the values of X, Y, and Z algebraically.

3. Solve the following equations:

a) $2X^2 + 32 = 0$

b) $2X^2 - 32X = 0$

4. Find the derivatives of each of the following:

a) $Q = \frac{12}{L^{2.5}}$

b) $P = \frac{Q^3}{3} + 700Q - 15Q^2$

5. Find the turning point for the following function:

$$Y = 3X^2 - 18X + 34$$

Part B

Answer **any three** Questions. **Each** question carries **ten** marks.

(3Qx10M=30)

6. The demand and supply functions for a good are given as:

$$\text{Demand function: } P_d = 100 - 0.5Q_d$$

$$\text{Supply function: } P_s = 10 + 0.5Q_s$$

Calculate the equilibrium price and quantity algebraically.

7. Solve the following equations:

a) $25(10)^{2t} = 208$

b) $38 + 12e^{-0.5t} = 208$

c) $\log(x + 2) = 2.5$

d) $2\ln(x) - \ln(x+1) = 0$

8. Given the demand function $P = 6 - 0.5Q$, find the value of MR for $Q = 1, 2, 3, 4, 5, 6,$ and 7 .

9. Use Cramer's rule to solve the equations:

a) $Y = 10X + 12$

$$4X + 2Y = 36$$

c) $P = 50 - 2Q$

$$P = 5 + 3Q$$

Part C

Answer **any two** Questions. **Each** question carries **fifteen** marks.

(2Qx15M=30)

10. The population of a village was 753 in 1980. If the population grows according to the equation:

$$P = 753 e^{0.03t}$$

a) Graph the population equation for $t = 0$ (1980) to $t = 30$ (in 2010).

b) Estimate the population in 1990 and in 2000 algebraically.

c) In what year will the population reach 1750 persons?

11. Given the matrices:

$$A = \begin{bmatrix} 1 & -4 \\ 0 & -9 \end{bmatrix}$$

$$B = \begin{bmatrix} 4 & 3 \\ -7 & 0 \end{bmatrix}$$

$$C = \begin{bmatrix} 5 & -1 & -1 \\ 12 & 0 & 2 \end{bmatrix}$$

Compute, a) $A + B$, b) $A + 4B$, c) $A + B^T$, d) CB^T , e) $C^T A$

12. $Y = -X^3 + 9X^2 - 24X + 26$

a) Find the turning points for the above function.

b) Determine which point is a maximum and which is a minimum.